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BRAITHWAITE'S RETROSPECT.

VOL. LXI. JANUARY—JUNE, 1870.

THE

RETROSPECT OF MEDICINE:

BEING

A HALF-YEARLY JOURNAL,

CONTAINING A RETROSPECTIVE VIEW OF EVERY DISCOVERY AND PRACTICAL IMPROVEMENT IN THE MEDICAL SCIENCES.

EDITED BY

W. BRAITHWAITE, M.D.,

LATE LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN AT THE LEEDS SCHOOL OF MEDICINE, ETC.

AND

JAMES BRAITHWAITE, M.D. LOND.

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SYNOPSIS,

(ARRANGED ALPHABETICALLY), CONTAINING

A SHORT ABSTRACT OF THE MOST PRACTICAL ARTICLES IN THIS VOLUME, SHOWING AT A GLANCE, THE MOST IMPORTANT INDICATIONS OF TREATMENT PUBLISHED BY DIFFERENT WRITERS WITHIN THE HALF-YEAR.

AFFECTIONS OF THE SYSTEM GENERALLY.

ACUTE RHEUMATISM.—There is no evidence to show conclusively that alkalies, lemon juice, or blisters curtail the duration of rheumatic fever. The blister treatment of Dr. Davies appears to very much relieve the acute symptoms, and the sufferings of the patient, but it does not actually shorten the duration of the case. The cases treated by us on the expectant plan recovered as favourably as under the treatment by drugs, and were as free from heart disease, if free from it when admitted into the hospital. (Drs. Gull and Sutton, p. 23.)

Perchloride of Iron.—The author states that he has found considerable benefit from the tincture of perchloride of iron in the treatment of acute rheumatism. He gives about thirty minims of the tincture every six hours. He has found the relief of the joint affection "definite, uniform, and speedy." This mode of treatment was suggested to him by its use in spreading inflammatory affections, as erysipelas. (Dr. J. R. Reynolds, p. 31.)

APOPLEXY.—There can be no doubt that breathing a close and impure atmosphere may be the immediate and exciting cause of cerebral hemorrhage. The blood imperfectly aerated is impeded in its passage through the minute arteries and capillaries, whose walls contract and hinder its progress. The heart then beats with increased force to overcome the obstruction, and produces the sense of fulness, pain, and throbbing in the head. It is but one step then to apoplexy, and that step is readily taken if the vessels are at all brittle or weak. (Dr. G. Johnson, p. 399.)

ENTERIC FEVER.—Enteric fever is a specific fever, and must therefore depend upon the presence of a specific poison. No simple contamination of drinking water with drainage mat-

ter will produce the disease, unless that drainage matter is contaminated with the dejecta of fever patients. This is abundantly proved by careful investigation of isolated epidemics. (Dr. T. C. Allbutt, p. 4.)

RHEUMATISM.—Rheumatism has a singular and inexplicable connection with the urethra. It is produced by the passage of sounds and lithotriptic instruments, as well as by the application of foreign matters. Urethral inflammation only is requisite to excite rheumatism in those who are hereditarily disposed to it. In gonorrhœal rheumatism, arrest of the discharge is often the readiest cure for it, though at other times it seems to follow the arrest of the discharge. (Mr. Acton, Dr. J. M. Fothergill, p. 36.)

SCARLATINA.—The reports of the Medical Officer to the Privy Council prove beyond doubt that no sanitary arrangements have any effect whatever in preventing the spread of epidemics of scarlet fever. In twenty-four towns, many of which are under very different sanitary conditions of air, water, and drainage, there is shown to be no relation whatever between the amount of fatal scarlatina and the sanitary state of the town. (Dr. W. Fergus, p. 14.)

TYPHOID FEVER.—*Belladonna.*—The poison of typhoid is completely counteracted by belladonna. It changes the whole character and outward manifestation of the disease. Delirium, coma, subsultus, quickly vanish, and calmness of mind and natural sleep return. If the patient is an adult and the fever is well developed, twenty or twenty-five drops of the officinal tincture may be given every four hours. This dose must of course vary to suit individual ages and constitutions. The most remarkable effect is the suddenness with which the patient recovers his intellectual faculties, and the full power and control of his muscles. The administration of the drug should be continued in most cases about two weeks, or until the case has lasted about twenty-one days. There is no observable bad effect from this plan of treatment beyond occasional slight dryness of the fauces. (Dr. B. Kelly, p. 10.)

AFFECTIONS OF THE NERVOUS SYSTEM.

CHOREA.—*Chloral.*—A severe case of chorea is related, in which the hydrate of chloral proved of great service, by procuring sleep, and so renovating the powers of life, exhausted by the constant spasmodic movements and want of rest. (Dr. J. Russell, p. 53.)

DELIRIUM TREMENS.—*A Possible Cause of.*—The alcohol in ordinary use (ethylic) is not the only form of alcohol found in nature. There are various heavier forms of alcohol containing more carbon. These heavier kinds of spirit are largely distributed for consumption, especially amongst the lower orders, and are possibly the cause of delirium tremens, as they probably are the cause of that continued coldness, lassitude, and depression which follow the well-known dinner with "bad wine." (Dr. B. W. Richardson, Medical Times and Gazette, Dec. 18, 1869, p. 706.)

EPILEPSY.—*Injection of Morphia.*—In the spansemic condition of brain found in epileptics, morphia injected subcutaneously acts like a charm, subduing the pain of epileptic neuralgia, and sometimes postponing, if not preventing, a convulsive seizure. (Dr. E. T. Wilson, p. 376.)

HEMIPARAPLEGIA.—Injury of one lateral half of the spinal cord in the dorsal region, above the dorso-lumbar enlargement produces paralysis of the lower limb on the same side as the injury, but the anæsthesia on the opposite side to the injury. On the paralysed side there will be hyperæsthesia to touch, to pain, to tickling, and to heat and cold. There will be elevation of temperature at first on the paralysed side. (Dr. C. E. Brown-Sequard, p. 43.)

INSANITY.—*Chloral.*—Chloral is decidedly the most valuable means of producing sleep which has yet been introduced into the Pharmacopœia of the Asylum physician. The only difficulty is to ascertain the exact dose for each case; but this is obviated by beginning with half-drachm doses, and increasing them by ten grains, until the limit is found. (Dr. J. B. Tuke, p. 55.)

Chloral in Acute Mania.—A case of acute mania is related in which there had been no sleep for five weeks, except for five minutes at a time, and in which opiates aggravated the disease. Twenty-five grains of chloral in two ounces of water, given at bed-time for three consecutive nights, produced marvellous effects. The second and third nights she slept nine hours. On the third day she was nearly well, and the pulse, which had been up at 130, had fallen to 90. There was no nausea, headache, or any other unpleasant effect produced. (Dr. G. Crawford, p 59.)

PAIN.—*Is it Rheumatic or Neuralgic?*—When the saliva is found decidedly acid in reaction, especially during digestion, the presence of an acid in excess may be at once inferred, and relief will be afforded by alkalies. When the reaction is not acid, the complaint is essentially neuralgic and not rheumatic. (Dr. J. M. Fothergill, p. 37.)

PARALYSIS.—*Diagnostic Use of Electricity.*—Electricity is of the following use in the diagnosis of the seat of disease in cases of paralysis. If you find the muscles of a paralysed limb, say the leg, respond readily to electricity, the nerve connection of the limb with the spinal cord must be perfect, and the portion of cord with which it is connected must be in a healthy state. The cause of the paralysis is seated higher up in the spinal cord or in the brain. Supposing, however, there is a diminution in the contractility of the muscles of the limb, or they do not respond to the stimulus at all, the cause of the paralysis must be either disease of the cord at the part from which arises the nerves of the paralysed limb, or there is some division of the nerve between the cord and the muscles (traumatic paralysis.) (Dr. J. R. Reynolds, p. 59.)

Electricity is of the greatest value in the diagnosis of paralysis, whether real or not, in cases of *railway accident.* A case occurred in which a man was paralysed in the arm and leg of one side, and it was thought by his own medical men that the loss of power was in a great measure ideal. On applying a strong electric current, however, to the muscles, little or no contraction resulted, although on the other side acute pain and powerful contraction were caused. It would have been impossible for the patient to sham this. (Dr. J. R. Reynolds, p. 63.)

SCIATICA.—*Hypodermic Injection of Morphia.*—Although other remedies may do more or less benefit to the patient in cases of sciatica, none will effect a cure and remove the pain except the salts of morphia, administered hypodermically. In recent cases a permanent cure is rapidly effected. (Dr. H. Lawson, p. 44.)

TETANUS.—*Chloral.*—A case of acute traumatic tetanus has been treated very successfully, with chloral, at the Lariboisière Hospital, Paris. From one drachm and a half to three drachms were given daily with the effect of relieving the pain completely, and the spasms almost entirely. No derangement of the stomach was produced. (M. Verneuil, p. 52.)

Calabar Bean.—A very full and free administration of Calabar bean is perfectly safe if the patient be well and carefully watched, so that the drug be given really as often and as much as the patient requires at the time. The drug is a direct counteractant of the disease. The relaxation of the muscles produced enables the patient to swallow food, and therein consists its superiority to all other relevants, such as chloroform and chloral, for instance, which prevent the taking of food. Two grains of the alcoholic extract about every

half hour or hour is an average dose during the height of the disease. If the paroxysms, however, become unusually severe, the same dose may be given every quarter of an hour for three or four times, till relaxation is produced, which will rarely fail to be effected. (Dr. E. Watson, p. 45.)

Subcutaneous Injection of Calabar Bean.—A case is related in which the antagonistic action of Calabar bean to tetanus is remarkably well illustrated. The extract was given by subcutaneous injection. At one period of the case as much as forty-one grains was given in twenty-four hours. After each dose the relief to the trismus and opisthotonos was speedy and complete; comfortable decubitus, and a feeling of drowsy ease taking the place of arched back, tense abdomen, quivering limbs, and anxious countenance. (Dr. W. Haining, p. 48.)

Nitrite of Amyle.—The author relates a case of tetanus in which great benefit was derived from the inhalation of nitrite of amyle. The spasms were entirely held in check for the nine days during which the disease was at its height. Five drops were given at a time, on a handkerchief, every time the spasm re-appeared. (Mr. M. Foster, p. 52.)

AFFECTIONS OF THE CIRCULATORY SYSTEM.

ANEURISM.—*Compression by a Weight in Cases of Popliteal Aneurism.*—Compression by a weight is a better means of arresting the current through the femoral artery than either ligature or pressure by a tourniquet. It is superior to the first inasmuch as any part of the artery can be compressed, whereas when the ligature is used we are confined to one spot. The avoidance of a wound is of course the principal advantage. The weight should be about twelve pounds of shot contained in a long bag, and having a lower end of solid lead the size and shape of the larger end of an egg. No pain is caused by this plan of treatment. The mode of application will be understood at once by reference to the woodcut at p. 164. (Dr. P. H. Watson, p. 160.)

HEART OR AORTIC DISEASE.—*Subcutaneous Injection of Morphia.*—Do not fear injecting morphia subcutaneously in distressing cases of heart and aortic disease. It may be used without fear, and the relief afforded to the sleeplessness and tumultuous action of the heart will be often surprising to the medical attendant as well as the patient. No matter how swollen the limbs, no matter how agitated the pulse, even up to the time of the dying agonies, the same relief will be given. It is well

to commence with an eighth or a sixth of a grain, but in ordinary cases a fourth of a grain will be found the proper dose afterwards. This should generally be given in the evening, and the room kept quiet afterwards, to favour the narcotic action of the drug. It is generally as well to examine the urine—for if albumen is found it is better not to give the morphia. The presence however of a small amount of albumen, not indicative of renal degeneration or of a great amount of secondary renal congestion, need not contraindicate its use. (Dr. T. C. Allbutt, p. 71.)

TORSION OF ARTERIES.—The author has made many interesting experiments upon torsion of arteries. After the ends had been twisted, the arteries were filled with vermillion-coloured wax injection, and sections subsequently made. In the majority of cases it was found that the hemorrhage is arrested simply by the inner coat being divided, and curving inwards, forming complete valves, not unlike the semilunar valves of the heart. This is the most perfect mode of closure, and to procure it the artery must not be too much twisted, and twisting of the end completely off is to be avoided. Four or five turns is generally quite sufficient for the purpose wanted. In some cases the inner coat does not incurve, but breaks up more or less into shreds, the blood coagulates amongst these, and the artery becomes firmly closed, but the support of the external coat is necessary. The more the end of a large artery is twisted, the more is the inner coat broken up, and the greater is the danger of disturbing its valvular incurvation. (Mr. T. Bryant, p. 149.)

VARICOSE VEINS.—*Obliteration.*—The division of veins on account of varicosity, if unaccompanied with some measure whereby the divided ends are effectually occluded, is a proceeding attended with great danger. Two needles should be passed under the vein to be divided, and slight pressure made on the vessel by means of ligatures passed over the ends of the needles. The vein may now be divided subcutaneously between the needles with perfect safety. By about the fourth day all symptoms of irritation will have subsided and the needles may be removed. This simple plan of treatment is very effective in the cure of varicocele. (Mr. H. Lee, p. 165.)

WEBBER'S ANTI-LIGATURE FORCEPS.—These forceps are intended to produce the same effect on arteries as the gnawing by the teeth of animals does in the division of the umbilical cord. So complete is the dovetailing and closure of the divided end of the artery that hemorrhage is effectually prevented even in large vessels. (Mr. Webber, p. 154.)

AFFECTIONS OF THE RESPIRATORY SYSTEM.

ARTIFICIAL RESPIRATION.—*New Instrument for carrying on.*—Dr. Richardson has had constructed a portable and handy form of bellows for producing artificial respiration. It consists simply of two india-rubber hand-bellows, each containing about four cubic inches of air, and terminating by two tubes in one common nozzle. The valves are so arranged that one is exhausting and the other supplying. The nozzle is introduced into the nostril of the patient and the two bellows compressed together at regular intervals, with the effect of forcing air into the lung during their compression and withdrawing air from the lung during their expansion. When the nozzle of the bellows is first introduced into the nostril, it is well, by two or three strokes of that side of the bellows which empties the lungs, to withdraw all the used-up air possible. It is also a point of importance to introduce the fresh air into the lungs very gently at first. (Dr. B. W. Richardson, p. 90.)

Induction of Artificial Respiration by means of Electricity.—Provided an efficient battery is used, such as that made by Dr. Stöhrer, of Dresden, artificial respiration can be easily produced by electric stimulation to the phrenic nerve. The rheophores should be sufficiently large to cover the whole width of the region traversed by the phrenic nerve. Stöhrer's batteries are very durable—give hardly any trouble, and are always ready for use on an emergency. When not in use the vessel containing the acid is lowered, and all chemical action ceases. (Ed. of Lancet, p. 95.)

CLERGYMAN'S APHONIA.—These cases depend upon muscular fatigue or weakness. The patient begins to speak in a clear and loud voice, and he continues to do so for a variable time, after which the voice becomes feeble, and it may soon be reduced to a whisper. At the same time there is a feeling of fatigue, and sometimes positive pain in the throat. With the laryngoscope we find no trace of structural change, or only slight congestion and redness, without swelling. This form of aphonia usually arises from overwork of the larynx, from speaking or reading in large churches. In most instances it has followed upon an inflammatory attack. The best plan of treatment is rest for the larynx as the organ of speech, change of air and scene, and a general tonic regimen. The daily application to the larynx of a saturated solution of tannin in glycerine often does good. Galvanism is of no use. (Dr. G. Johnson, p. 76.)

CROUP.—*Morbid Anatomy of.*—Two distinct diseases are confounded under the name of croup. 1. Acute catarrhal laryngitis, in which there is nothing more than congestion and swelling of the mucous membrane of the larynx, with mucous or puriform exudation on the surface. 2. Diphtheritic croup, attended with the formation of a false membrane independently of the age of the patient or the severity of the inflammation, but simply on account of the specific character of the disease. (Dr. G. Johnson, p. 79.)

Local Treatment by Lactic Acid.—Lactic acid is a solvent of fibrinous exudations, such as that of croup. This property may be made of use in the treatment of that disease. The patient must be made to inhale a solution of lactic acid (fifteen to twenty drops in half an ounce of water) in the form of spray, at first every half hour, and afterwards when the respiration improves less frequently. (M. A. Weber, p. 81.)

HOOPING COUGH.—*Hydrate of Chloral.*—In children about six years old five grains of hydrate of chloral given three times daily, in a little syrup and water, will usually mitigate the severity of the paroxysms. Six grains, given only at bedtime, will in most cases ensure a comparatively quiet night. (Mr. A. M. Adams, p. 82.)

AFFECTIONS OF THE DIGESTIVE SYSTEM.

CHRONIC CONSTIPATION.—Minute doses of watery extract of aloes (gr. j.) combined in a pill with sulphate of iron (gr. ij.), and taken three times a day after the principal meals—if combined with regulation of the diet and constitutional exercise, afford a means not only of relieving, but of curing, habitual constipation. Nothing approaching to purgation ought to be permitted. Gradually it will be found that less and less of the medicine is required, until, after the lapse of some months, only one pill occasionally is required for the sake of warding off old troubles. (Dr. J. K. Spender, p. 97.)

Belladonna in Habitual Constipation.—No medicinal remedy is so valuable as belladonna in cases of habitual constipation. The dose should be from one-sixth to half a grain daily. It never purges, but produces natural evacuations not followed by constipation. (Dr. F. B. Nunneley, p. 389.)

HEMORRHOIDS.—*New Clamp.*—The clamps in present use do not press equally on all the parts to be removed. If, however, the joint screw is placed at right angles to the blades the action becomes perfectly parallel. By this plan of construction, moreover, a scooping action is at the same time secured, so

that the deepest part of the pile is seized and drawn forwards. The shape of the scissors used has to be modified to suit them to the curve of the clamp. (Mr. S. Jones, p. 173.)

INTESTINAL WOUNDS.—*To Close.*—Cut two pieces of cork into the form of quadrangular prism, the length of the wound to be closed, and perforate each with pins so that they present the appearance of small combs. The heads of the pins should be driven well up to the cork and embedded in sealing-wax. These are then placed within the wound, *i.e.*, on the mucous surface of the bowel, one within either lip. The pins should now be made to penetrate the lips of the wound from within outwards, and then the edges being inverted, the points of the respective rows of pins are made to face towards each other, and then the pieces of cork being forced together they are firmly locked by the pins. In the course of a few days the portion of tissue traversed by the pins detaches itself within the bowel, and the cork comes away by stool, leaving the wound firmly closed. (Dr. Beranger-Feraud, p. 171.)

OBSTRUCTION OF THE BOWELS.—*Hypodermic Injection of Morphia.*—In cases of obstruction of the bowels in which the symptoms are becoming urgent, with vomiting and severe pains, the hypodermic injection of morphia gives more chance of relief than any other plan of treatment. Not only the pain but the vomiting also will be relieved, and it will then be found that aperients will act. (Dr. J. Barclay, p. 378.)

STRANGULATED HERNIA.—*Caution as to the use of Morphia.*—In cases of strangulated hernia, accompanied with much abdominal pain and vomiting, great relief to the symptoms is given by subcutaneous injections of morphia. The pain and vomiting will perhaps cease, and you are liable to think that the strangulation is relieved, and an operation unnecessary. Yet the tumour will probably be found unaltered in condition, as proved by the absence of expulsive impulse on coughing, in fact, the symptoms have been masked, but the disease is as bad as ever, and serious changes are progressing in the strangulated bowel. (Mr. Maunder, p. 170.)

AFFECTIONS OF THE URINARY ORGANS.

ACUTE ORCHITIS.—The simplest, most satisfactory, and most efficient treatment of acute orchitis is by opium. After clearing out the bowels a grain of opium given twice a day will generally relieve all the tenderness and pain, and much of the swelling. (Mr. J. Rouse, p. 194.)

CATHETER.—*New form for retention in the Bladder.*—Catheters made of vulcanised india-rubber are quite unacted upon by the urine, and consequently can be worn habitually by patients in cases of prostatic or urethral disease. The difficulty is their retention in the bladder. This may be got over by the catheter having two little wings or fins of the same material placed just below the hole. These give way sufficiently to allow of the instrument being passed into or withdrawn from the bladder, but are quite sufficient to prevent its slipping out accidentally. All tapes and other means of fixing the instrument are thus done away with, and endless trouble avoided. (Mr. B. Holt, p. 189.)

New Retentive Catheter.—By a simple contrivance, vulcanised india-rubber catheters may be made retentive. A piece of string is passed through the catheter, and made to emerge through a clean hole an inch and a half from the point. The end is to be firmly attached to the point. After insertion it is only necessary to pull on the string to reduplicate the terminal portion. The free end of the string is to be fastened to a slot on the collar of the catheter. When it is wished to withdraw the catheter, its elasticity will cause it to assume its original form when the string is loosened from its attachment at the collar. (Mr. R. Davy, p. 193.)

DIABETES.—*Milk Diet.*—A purely milk diet in the treatment of diabetes is as superior to a purely animal diet as the latter is to a mixed one. The rapidity with which it acts is sometimes truly surprising, twenty-four hours being sufficient for the production of a marked improvement; the quantity and density of the urine suddenly fall, and the thirst and voracious appetite disappear, the skin becomes moist and perspiring, while the symptoms referable to the nervous system are rapidly relieved. (Dr. A. S. Donkin, p. 104.)

A purely milk diet offers hopes of cure in diabetes, or at least of great amelioration in the symptoms. In some cases after a period of two or three months there is complete disappearance of sugar in the urine, and then the diet may, if desired, be rendered more solid, by the detraction of some of the milk, and the addition of butcher's meat and green vegetables. (Dr. G. W. Balfour, p. 107.)

Opium in Diabetes.—Opium, morphia, and codeia, have a direct controlling power over the elimination of sugar in diabetes. There can be no doubt whatever about this, for it has been most carefully and accurately determined. Codeine has, however, a great advantage over opium and morphia, in that whilst it is equally efficacious in controlling the disease, it

does not exert the same narcotic effect. When given in a dose of half a grain to begin with, and increased gradually to ten grains three times daily, nothing may be seen beyond its effect upon the disease. The pupils do not become contracted, nor is there any constipating action; the tongue remains clean, and the appetite unaffected. (Dr. F. W. Pavy, p. 109.)

ENLARGED PROSTATE.—*Removal of hard masses from the Prostate during Lithotomy.*—A great deal of the distress arising from stone in the bladder in elderly men, is owing to the existence at the same time of enlarged prostate. In some of these cases, as the forefinger passes towards the bladder through the incision made in the ordinary lateral operation, the sensation is perceived as if its point glided through several rounded bodies in the substance of the gland. These bodies are very loosely connected with the rest of the tissue, and are apt to slip between the blades of the forceps with which the stone is seized, and hinder its withdrawal. There is no reason, whatever, why one or more of these bodies should not be removed, either by enucleation with the finger, or by means of the lithotomy forceps. Such removal is not found in practice to do any harm, and is on the other hand likely to be of benefit by diminishing the size of the gland. (Sir W. Fergusson, p. 184.)

INCONTINENCE OF URINE IN CHILDREN.—*Collodion.*—This disease appears to be owing to want of power of contraction of the sphincter of the bladder. The bladder must be trained to retain its contents for longer periods at a time. Take the edge of the prepuce and draw upon it slightly, so as to raise up a portion into a little cup, and apply to this a little contractile collodion by means of the blunt end of a penholder. As it contracts it will draw firmly together the edges of the prepuce and seal them up effectually. When the child or youth desires to pass water, the little wedge of collodion is easily removed by the finger nail, and the application again made by the patient himself. It is found that the slight mechanical pressure thus produced, is quite sufficient to prevent the discharge of urine, and after a time the case is permanently cured. (Sir D. J. Corrigan, p. 198.)

LITHOTOMY IN THE INFANT.—*The Staff for.*—The groove should be on the convex surface of the instrument, so as to be at its full depth where the surgeon strikes for it, at the beginning of the membranous portion of the urethra. One side of the groove however should be a little lower than the other, so that when the instrument is introduced, the side next the left hand of the operator may be a little lower than the other, which condition should maintain

to within three-quarters of an inch of the end of the instrument, when it should gradually come up to a level with the opposite side. This arrangement facilitates the lateralization of the knife to the required extent. Too much stress cannot be laid upon the necessity of freely opening the entire of the membranous portion of the urethra by the one and continuous stroke of the knife. (Dr. R. G. Butcher, p. 180.)

PERINEAL SECTION.—Unless the urethra is *really* laid open through the entire track of the strictured portion, nothing but disappointment will ensue in the end. The patient being placed in the lithotomy position, with the buttocks slightly raised, pass a curved staff of full size, grooved on its convexity, down to the stricture. The perineum must now be laid open centrally by a scalpel passed with its cutting edge upwards, directly to the apex of the prostate gland, for which purpose the left index finger in the rectum serves as the guide. The urethra should then be opened, not at the point of the staff but a quarter of an inch from it. The staff must now be withdrawn a little and turned round so that the point projects from the wound. It is then used simply to steady the urethra. Before the staff is altered in position, however, each lip of the urethral wound must be seized with artery forceps, and with these the canal drawn open. If the parts are now carefully sponged, the interior of the canal is so fully exposed to view, that with the aid of a fine probe-director the way may be completely cut through the stricture into the dilated part behind it. The whole thing is thus done by sight, and you are certain to have opened up not a new, but the old track to the bladder. (Mr. C. G. Wheelhouse, p. 187.)

URINE.—*Effect of Lemon-Juice on the.*—It is quite a mistake to suppose that lemon-juice can make the urine alkaline. Neither lemon-juice, nor any other free vegetable acid or mineral acid, can cause the urine to become alkaline; although when there is an irritable stomach, the urine may frequently be found to be alkaline during digestion, even when mineral and vegetable acids are taken in large quantities. (Dr. H. B. Jones, p. 110.)

AMPUTATIONS, DISLOCATIONS, FRACTURES, ETC.

AMPUTATION.—*Wharton's Modification of Teale's Amputation.*—There are several objections to Teale's rectangular flap amputation, the principal of which is the high division of the bone. Wharton's modification avoids this. The measurements should be made and the flaps marked out exactly as in Teale's operation—but, instead of dissecting the bone, let it be sawn at

the situation corresponding to the inferior termination of the posterior flap, and let the superior boundary of the anterior flap be limited by the same plan. The saving of bone thus effected will be considerable, and therefore tend directly to diminish the mortality of thigh amputations. According to this method the anterior flap will be shorter by a fourth, and there will be no posterior flap. (Mr. W. Stokes, p. 117.)

Amputation at the Hip-joint.—The two things which have chiefly contributed to reduce the mortality from amputation at the hip-joint are, the use of chloroform, and compression of the aorta. Formerly the operation was hardly ever successful, owing either to shock from the operation or loss of blood during its performance. The best abdominal compressor is Lister's. The introduction of antiseptic surgery will reduce the mortality still further by lessening the drain on the system which takes place during the healing of so large a wound. (Mr. T. Annandale, p. 113.)

ANTISEPTIC SYSTEM.—*Comparative Effects of the Antiseptic System in the success of Amputation at a Hospital.*—The antiseptic plan of treatment having now been adopted for three years at the Glasgow Infirmary, its effects upon the mortality from amputation can be judged of. Taking the major amputations only, before the antiseptic period there were 16 deaths in 35 cases; or 1 death in every $2\frac{1}{5}$ cases. During the antiseptic period there were 6 deaths in 40 cases; or 1 death in every $6\frac{2}{3}$ cases. (Prof. Lister, Lancet, Jan. 8, 1870, p. 40.)

Antiseptic Ligature.—The material lately used by Mr. Lister for this purpose is silk steeped for a while in a mixture of melted beeswax with about a tenth part of carbolic acid. As the silk is taken out of the hot liquid it is drawn through a dry cloth to remove the superfluous wax; after which it may be wound on a reel and kept in any close vessel. (Prof. Lister, p. 123.)

Compound Dislocation of the Ankle.—Antiseptic Treatment.—In a case related by Prof. Lister, he, of course after reducing the dislocation, injected the joint with the strongest watery solution of carbolic acid which can be made—viz., one part of the crystals to twenty of water. This solution was then squeezed out and the process repeated a second time. The external dressings were then applied as often recommended by Mr. Lister, and the leg put up on a splint. The lac plaster has been very much improved of late by being incorporated with soft cloth instead of spread upon calico. It should be used in a double layer. Cases of compound dislocation of the ankle were generally fatal before the introduction of the anti-

septic plan of treatment; now, however, a fatal result is the exception, and the patient usually gets well without any suppuration, and with but little constitutional disturbance. (Prof. Lister, p. 121.)

Sloughs in the Neighbourhood of Contused Wounds.—It is essential that every isolated slough which may exist in the neighbourhood of a contused wound should be dressed antiseptically like the wound itself. In order to secure this let the antiseptic plaster overlap the apparently uninjured skin far and wide in all directions. On the following day any dead portions of skin (recognised by their dusky discolouration) should be dressed with a piece of protective plaster covered by a piece of antiseptic lac plaster. Treated in this way they will be absorbed and reorganised into living tissue without any suppuration whatever. If the antiseptic lac is allowed to come into contact with the skin it will excite to "antiseptic suppuration" in the living parts surrounding the slough. (Prof. Lister, p. 135.)

Excision of the Knee-Joint.—When the cut surfaces of the bones have been placed in as complete apposition as possible, the limb should be bandaged along the whole length, except in the line of the wound, upon a splint placed behind and provided with a foot-piece, The edges of the wound should then be united with sutures, and long splints applied at the sides, with pads above and below the knee so as to defend the operated part from undue pressure, and permit discharge to escape if any suppuration takes place. The bandages must be moistened with blood, which sets and affords additional security. Great care must be taken to adjust the parts well and firmly in the first instance. If this plan is followed immediate union of the wound will often occur, and it will not be necessary to remove any of the bandages until bony union has occurred. (Dr. G. M. Humphry, p. 394.)

Transverse Fracture of the Patella.—The reason of the difficulty in keeping up accurate coaptation of the broken parts is not contraction of the quadriceps extensor, but fluid pressure from within. The damaged muscle, so far from being contracted is in a remarkable state of physiological inactivity, and sometimes it becomes permanently and completely atrophied. (Mr. J. Hutchinson, p. 144.)

Whisky as an Antiseptic Dressing.—Alcohol is an excellent antiseptic dressing for wounds. Having removed foreign substances or clotted blood, wash thoroughly with strong whisky, and close with stitches if necessary. Then cover with a rag and bandage, both saturated with whisky; and finally

all is enveloped in gutta-percha tissue or oiled silk, and directions given to the attendants to wet the bandage from time to time with the spirit. (Dr. D. Blair, p. 141.)

AFFECTIONS OF THE SKIN, ETC.

ALOPECIA AREATA.—This disease is not owing to the growth of a parasitic fungus at all. The Microsporon Audouini is a myth. A temporary malnutrition of the roots of the hairs suffices to explain everything. The continuous cell-proliferation at the root ceases, the hair does not advance, atrophies, and drops off. It will be noticed that there is usually a thinning of the hair over the whole scalp. (Prof. Rindfleish, p. 222.)

CARBUNCLE.—*Carbolic Acid.*—The idea has lately been started that boils and carbuncles are parasitic in their origin. This idea is borne out by the success attending their treatment with carbolic acid. Cryptogamic vegetation resembling that of sycosis has, in one or two cases, been actually found; but whether this is constantly present or not has not yet been determined. After making a free crucial incision the tumour should be covered with lint soaked in oil containing one part to five of carbolic acid, and strips of the same should be laid in the fossæ formed by the divisions of the diseased mass, and afterwards inserted into all the natural openings which may form in it. The oil and acid should be renewed every few hours. (Dr. P. Eade, p. 217.)

PRURIGO.—Prurigo, as well as other lesions of the skin, such as erythema and herpes, sometimes is dependent upon a morbid state of nerve function. Such cases are not amenable to local remedies, and arsenic not uncommonly disagrees and is altogether unsuitable to the case. There may be intense pruritus uncomplicated with any marked affection of the skin visible to the eye, or with only slight herpes or erythema, but attended by nervous debility, neuralgic pains, and general low tone of system. Quinine, in ten-grain doses daily, is more likely to be of service here than any other plan of treatment. If accompanied by pruritus vulvæ or ani, juniper tar soap should be used for purposes of ablution, and then oxide of zinc ointment applied. If the pruritus is worst at night, as is usually the case, the quinine should be taken at bedtime in a glass of sherry. (Mr. E. Wilson, p. 213.)

Prurigo Senilis.—This disease has no connection with phtheriasis corporis, the disease due to the presence of lice. Let the patient wear a complete underdress of vulcanised india-rubber cloth. This same plan is also of use in case of prurigo and

ichthyosis, and probably in most obstinate localised eruptions. (Dr. McCall Anderson, p. 204.)

PSORIASIS.—*Carbolic Acid.*—Carbolic acid is a valuable local application in cases of psoriasis. One part by weight of the acid to four of common lard should be melted down and mixed, and afterwards allowed to cool. This ointment ought to be applied every night, and covered with gutta-percha tissue to prevent evaporation. The dressing should be continued until the scales begin to disappear and the skin assumes a healthier aspect, when the oxide of zinc ointment may be substituted for it. (Dr. J. M'Nab, p. 219.)

SEA-AIR IN SKIN DISEASES.—Sea-air and sea-water are very apt to prove prejudicial to the subjects of skin affections, with the exception, perhaps, of those labouring under strumous diseases. (Dr. McCall Anderson, p. 205.)

TINEA.—In all the tineæ, although active treatment is required for the destruction of the parasite, we must not forget that parasites do not grow except upon soils suitable for them. There is always tardy assimilation, and want of fatty matter in the system. Cod-liver oil or fatty foods are required, with all measures calculated to improve the general health, and in adults, freedom from worry and care. (Dr. T. Fox, p. 208.)

URTICARIA PERSTANS.—In nettle-rash, recurring from day to day and from week to week, when it is independent of local causes, and when no constitutional derangement is present, sedatives are sometimes curative, especially bromide of potassium in full doses. (Dr. McCall Anderson, p 207.)

VENEREAL AFFECTIONS.

GONORRHŒA.—*New Injection Syringe.*—Mr. Durham, of Guy's Hospital, recommends the treatment of gonorrhœa by means of a new form of syringe, which will be understood at once by reference to the woodcut at p. 269. It is like the ordinary india-rubber barrel syringes in appearance, but smaller, and modified for the purpose intended. The nozzle intended for introduction into the urethra is three and a half inches in length, and terminates in an olive-shaped bulb. The injection escapes at the base of this bulb, and is forced out in a backward direction. The bulb prevents its passing further up the urethral canal. The patient must always pass water before the syringe is used, and a little tepid water should be injected first, in order to thoroughly wash out the passage. The frequent use of a weak injection answers better than the seldom use of a stronger one. (Mr. A. E. Durham, p. 265.)

SYPHILIS AND CHANCRE.—Every sore is not syphilitic. There is a large proportion which are merely chancres, not productive of any subsequent constitutional disorder whether mercury is given or not (which it ought not to be). On the first appearance of a sore we cannot positively determine whether it is true syphilis (hard chancre) or not (soft chancre). This, however, is of the less moment that the poison is absorbed into the system the moment of connection if it be true syphilis, and no treatment of the sore can ward off its effects. The best plan, and the only safe one, is, to invariably destroy the surface of a sore, no matter of what kind, with strong nitric acid, and then to rub nitrate of silver upon the destroyed surface. The nitrate generally relieves the pain caused by the acid. Should the sore, however, not be seen for some weeks, and there is induration of the sore and enlargement of the glands in the groin, it is not worth while applying the acid, and small doses of mercury should be given at once, or deferred until an eruption occurs, if there is the slightest doubt as to the real nature of the sore. (Mr. J. C. Forster, p. 253.)

SYPHILITIC ECTHYMA AND RUPIA.—There is no doubt that in some cases patients are much benefited by a careful administration of mercury. If we find the patient cachectic and ill, and the sores increasing in number and size in spite of good feeding, it is better to give mercury at once. As a rule, however, it is perhaps wiser to try previously iodide of potassium, in doses of ten grains to two scruples, three or four times a day. Whenever patients are the subjects of the "gummy products" of syphilis, or of the so-called "cancer of the face"—a part of the body this tertiary form of the disease seems particularly to like—they are most quickly cured by the use of this drug; and if they are not quickly treated with it, the most frightful deformity is left. (Mr. J. C. Forster, p. 261.)

AFFECTIONS OF THE EYE.

FLEXIBLE LACHRYMAL PROBES.—Bowman's probes, if not bent so as to correspond with the exact direction of the duct in the individual operated upon, are liable to lacerate the mucous membrane of the passages. Flexible probes made of alloyed silver, having bulbous extremities, are more suitable and adapt themselves to the sinuosities of the passages. (Dr. Williams, p. 226.

Leaden Styles for Lachrymal Obstructions.—The ordinarily used silver styles do not adapt themselves accurately to the lachry-

mal canal, but press unduly upon several points and not at all upon others. Hence the case is much prolonged, the passage having to become adapted to the unyielding style before much good is effected. Styles made of the purest and softest lead drawn into wire are far more suitable, more rapidly cure the case and with less distress to the patient. (Dr. J. Green, p. 227.)

GRANULAR LIDS.—*Simple Syrup as a Collyrium.*—The most successful treatment for ordinary cases of granular lids is that which acts by mechanical lubrication. Simple syrup, combined in some cases with other remedies, such as vinum opii or atropia, answers admirably. About three drachms of the best sugar to the ounce of water, filtered quite clear, forms a solution which does not deposit sugar. A little may be dropped into the eyes as often as they feel uneasy. (Mr. L. Tait, p. 252.)

OPHTHALMOSCOPE.—*Dr. Lionel Beale's Self-illuminating Ophthalmoscope.*—This consists of a brass telescope tube containing a reflector near the eye-piece, and a small paraffin lamp placed laterally so as to throw its light upon the reflector. This arrangement much facilitates ophthalmoscopic examinations, in many cases renders the use of atropine unnecessary, and obviates the necessity for a darkened room. The instrument is remarkably easy to use, even those who have had no experience succeed almost upon the first trial. (Dr. L. Beale, p. 224.)

PANNUS.—*Inoculation.*—If inoculation by gonorrhœal matter is used in all cases of pannus which you cannot otherwise cure, a certain proportion of your cases will prove disastrous, and irretrievable mischief ensue. Only those cases should be thus treated in which *the whole* cornea is vascular. It is the presence of a little bit of clear cornea which is to be feared, and when that is present inoculation is inadmissible. (Mr. L. Tait, p. 252.)

SENILE CATARACT.—It is never advisable in senile cataract to operate upon both eyes at the same time, and not at all if the sight of one eye remains good. It is also necessary to be sure that the cataract is quite mature, otherwise in extraction a portion of the hard surface matter may separate from the harder central part and remain behind the iris or in the pupil. (Mr. J. S. Wells, p. 233.)

STRABISMUS.—*Should one or both Eyes be operated on?*—By a properly performed tenotomy we are able to cure a divergence of 2 to 2½ lines, not more. If, therefore, the divergence is greater than that, a double operation is necessary. If the

divergence is less than 2½ lines we must apply a conjunctival suture so as to somewhat approximate the divided ends of the tendon. When both eyes are operated on it should not be at one sitting, but the second four or five days after the first, in order that the effect of the first operation may be properly estimated. (Mr. J. S. Wells, p. 247.)

MIDWIFERY, ETC.

Anointing in Infantile Disorders.—Anointing the skin of the body with salad oil in infantile disorders is a remedy of more value and of more general application than is usually thought. It acts as a fuel-food, not only preventing waste of tissue, but actually increasing the bulk of the little patient. In atrophy, bronchitis, convulsions, diarrhœa, and febrile disturbances generally, it is of use. Some very interesting cases are given illustrative of its employment in these diseases. (Dr. H. G. Knaggs, p. 332.)

Chronic Inversion of the Uterus.—If we cannot restore a uterus chronically inverted, by the hand, our next plan is to employ elastic pressure, and even if this does not succeed ablation must not be resorted to until the following operation has been tried. A shallow incision should be made on either side of the os uteri, say a third of an inch deep and two-thirds long. To accomplish this the uterus must be drawn down outside the vulva, by means of a sling of tape passed round its body. This having been done the elastic pressure must be reapplied. After the incisions have been made the uterus can be restored by pressure with the hand, but this is liable to cause the tissues of the organ to tear a little at the points of incision. (Dr. R. Barnes, p. 313.)

Ergot.—No preparation of ergot in which a single solvent is used can be a complete representative of the soluble portions of the drug. The ergot should first be exhausted with ether and alcohol, and the residuum with hot water. If the ethereal solution and the aqueous infusion are now strongly agitated together with crystallised sugar they will mix and form a homogeneous syrup. This syrup is very certain in its action. (Dr. C. Ronayne, p. 286.)

Ergot excites contraction of the non-striated muscles generally, including those of the vascular system. Hence its use in hæmoptysis from cardiac or pulmonary disease, in albuminuria and menorrhagia. Its action is increased by certain combinations, particularly with digitalis in heart diseases. (Dr. C. Ronayne, p. 285.)

MIDWIFERY FORCEPS.—*A New Form of Short Forceps.*—The ordinary short midwifery forceps are by no means everything that can be desired in the slighter cases of disproportion, and in those numerous cases of retarded labour from exhaustion or constitutional debility. For this class of cases a light and portable form of forceps has been invented by Dr. J. Braithwaite, of Leeds, in appearance somewhat like a single blade. This is introduced directly into the hollow of the sacrum, then separated into the two blades of which it really consists, and these are glided one upwards and the other downwards so as to embrace the head. They can be introduced without the knowledge of the patient, and without touching the external parts of the mother or disturbing her position on the bed. In the severer class of cases they can be applied in the usual way. (p. 273.)

OVARIOCENTESIS VAGINALIS.—The operation of tapping an ovarian cyst from the vagina, and afterwards adopting means to cause atrophy and obliteration of the cyst, has been performed now in 55 published cases, with an encouraging amount of success. It is only applicable when the fluctuation can be distinctly felt in the vagina, and when that passage is not of unusually small size. Although multilocular cysts may be treated in this way, it is more applicable to unilocular ones. The tumour being well pressed down into the pelvis is to be punctured with a long curved trocar. The stilet is then withdrawn, and a knife, having a blade projecting an inch and a half beyond the canula and fixed on a handle suited to the curve of it, is passed. The canula and knife are now withdrawn, and at the same time the opening is enlarged so as to admit of the introduction of the finger. An elastic tube, about as thick as a finger, is then introduced and bound external to the genitals. The after treatment is of vital importance, and consists of the use of disinfectant injections and scrupulous cleanliness. (Dr. E. Noeggerath, p. 295.)

OVARIOTOMY.—*Effect of Tapping upon a subsequent Ovariotomy.*—A careful study of three hundred cases of ovariotomy, conclusively shows that the mortality from that operation is but little affected by previous tappings—that the fact of a patient not having been tapped, or having been tapped very often, is by itself of little or no value in prognosis. The reason is that such adhesions as are apt to follow tapping, have no appreciable effect upon the success of the operation, and there are often no adhesions at all in patients who have been tapped the most frequently. Tapping one or more times is often a useful prelude to ovariotomy, either as a means of gaining time for a patient's general health to recover, or by lessening

shock, by removing fluid a few days or hours before removal of the solid tumour. (Mr. T. S. Wells, p. 302.)

PARTURITION.—*New mechanical appliance as an aid to.*—It is the want of power in the abdominal muscles which makes the labour of a woman in civilised life so much more difficult than that of a savage. The author has invented an instrument, which to some extent supplements the power of the abdominal muscles. It consists of a sacral and a pubic pad, retained in their places by lateral springs, which embrace the pelvis below the crista ilii, a fixed point having been thus gained. Attached to the sacral pad are two vertical levers, and one horizontal, the former (vertical springs) end each in a costal spring, embracing the thorax, and united by a sternal pad, so arranged as not to incommode the chest in respiration; the latter, or horizontal, is a powerful spring buckled to a belt closely adjusted to the abdominal walls, and connected above to the costal springs and below to the pelvic band by elastic rings. It is thus constructed, so as to act in the manner of the abdominal muscles. During the parturient pains, this belt is readily tightened at will, to assist or supply the place of the voluntary muscular contractions, and is as readily relaxed in the intervals of pain. When required, it may be made to maintain a steady uniform pressure, as is often needed *post partum*. This force, reacting upon the sacral pad, affords to the patient that support in the lumbar region which is so much called for during labour, and which is usually supplied by the hands of the nurse. (Dr. P. Smith, p. 291.)

PELVIC CELLULITIS.—In the majority of these cases the inflammation is one of the serous membrane alone, whilst in some, the inflammation is extra-peritoneal. There are two distinct affections—not always possible to diagnose from each other, but generally so. In pelvic cellulitis the uterus is usually pushed to the opposite side of the pelvis from that occupied by the phlegmon, whereas in some cases of peritonitis the body and fundus of the wound are so completely lost amidst the general exudation that their exact position cannot be determined. In the treatment of these cases removal of blood by leeches applied round the anus is quite as effectual as the application of leeches to the uterus itself, and not open to the objections to which that plan is. Opium and morphia suppositories and the subcutaneous injection of morphia are generally called for. From mercury no benefit is likely to accrue. (Dr. L. Aitken, p. 322.)

PESSARY.—*Improved Elastic Pessary.*—The objection to the ordinary elastic pessary is its great size for introduction and

removal, and the annoyance caused by the tube attached to the pessary for the purpose of inflation. To obviate these things the author has invented a pessary which can be introduced and withdrawn in a collapsed state, and inflated easily on introduction. It is made by Salt, of Birmingham. (Mr. J. Clay, p. 307.)

POLYPUS UTERI.—Never induce anæsthesia for the removal of a polypus uteri. If the ligature be tightened round a polypus it gives no pain; if it be tightened round a portion of uterus the pain produced gives warning, and the opportunity of retrieving error. (Dr. R. Barnes, p. 316.)

POST-PARTUM HEMORRHAGE.—But few cases of post-partum hemorrhage would occur if a full dose of ergot were given immediately after the birth of the child. It would be a vast improvement in obstetrics if the forceps could be substituted for ergot, as now often given during labour; and if the ergot were given habitually at the moment of birth. By this plan subinvolution of the uterus would become less frequent. (Dr. Tyler Smith, p. 291.)

Injection of the Uterine Cavity with Perchloride of Iron.—There certainly are cases of post-partum hemorrhage which neither pressure upon the uterus, cold, nor ergot of rye will arrest. These remedies must not be persisted in until collapse sets in. The uterus should at once be injected with perchloride of iron. Dr. Barnes carries about with him for this purpose a case containing a Higginson's syringe and a bottle of perchloride of iron. (Dr. R. Barnes, p. 289.)

PRURITUS OF PREGNANCY.—*Its Cure by Smoking.*—A case of severe pruritus from pregnancy is related in one of the French journals, in which no remedy gave any relief until, by the advice of her husband, the patient smoked tobacco. She found immediate relief, and took one cigar every evening during the continuance of pregnancy, with the effect of completely preventing another accession of the complaint. (p. 288.)

RECTUM.—*Eversion in Women for Purposes of Examination.*—In men some form of speculum is always necessary for examining the rectum, but in women there is a far more effectual method. Pass the finger into the vagina and press it backwards and downwards over the levator ani, the rectum can be everted through its sphincter like a glove. This can ordinarily be done to a very great degree; it can always be done to a very great extent. Should the sphincter be unusually irritable or spasmodically contracted, it can be forcibly distended by the

thumbs and temporarily ruptured. The whole of the mucous membrane can by this plan be minutely inspected, and the treatment necessary be more effectually applied. (Prof. H. R. Storer, p. 325.)

RIGID OS.—*Hydrochlorate of Apomorphia.*—Apomorphia, one of the alkaloids obtained from opium, possesses powerful emetic properties. A case of extremely rigid and unyielding os uteri is related, in which ¼ grain of the hydrochlorate of apomorphia caused immediate relaxation of the parts. The effect was so rapid and perfect that the child was expelled with ease, although labour had previously lingered on for many hours. It might be used by subcutaneous injection. (Dr. Milne, p. 308.)

SICKNESS AND DIARRHŒA OF CHILDREN.—When the motions are frequent and slimy, and also when they are of a grass-green colour, a drop of ipecacuanha wine given every hour, or less frequently, according to the severity of the symptoms, will generally prove a very successful treatment. The presence of sickness may be accepted as a special indication of its usefulness. (Mr. C. C. Fuller, p. 335.)

TUMOURS OF THE BREAST.—*Bromide of Potassium Externally.*—In cases of painful tumour of the breast, probably cancerous, apply the following lotion by means of a piece of flannel saturated in it and covered with oil-silk: one ounce of acetic acid B.P.), two drachms of bromide of potassium, and five ounces of water. It will relieve the pain, and even produce lessening in the size of the tumour. (Dr. H. Osborn, p. 332.)

VERSION AFTER FAILURE OF THE FORCEPS.—If it is found impossible to deliver a child by the forceps, there are some cases in which version is far preferable to craniotomy. If, however, there is considerable doubt as to whether the forceps will fail, version should always be preferred as the primary operation, provided the state of the uterus is favourable, and chloroform can be given. (Dr. J. B. Hicks, p. 277.)

MISCELLANEA.

ALCOHOL.—*Its Action on the System.*—The true character of the alcohols is that they are agreeable temporary shrouds. There is no evidence at any stage of their action that there is increase of power in the organism. The overwhelming fact of reduction of temperature following their use, quite puts out of the question any chemical consumption of them within the body to any amount. If, under scientific administration

alcohol is found to cure fever, it can only act by lowering temperature and checking waste, not by sustaining as food sustains the body. (Dr. B. W. Richardson, Medical Times and Gazette, Dec. 18, 1869, p. 706.)

APOMORPHIA AS AN EMETIC.—Apomorphia is obtained by digesting morphia in concentrated hydrochloric acid, at a high temperature for several hours. It differs chemically from morphia in containing an equivalent less of hydrogen and oxygen, or the elements of water. It is the most speedy and certain emetic known, and its action is not accompanied or followed by any baneful effects. The tenth of a grain of the hydrochlorate of apomorphia, or even less, is the dose required. It may be given with safety to children, and it acts more rapidly when hypodermically administered. (Dr. F. M. Pierce, p. 381.)

BICHLORIDE OF METHYLENE.—Bichloride of methylene is not all that can be desired as an anæsthetic. It is certainly marvellously rapid in its action, and it answers the end in view, but it belongs to a dangerous family of chemical substances, and cannot be played with without risk. It is certainly safer than chloroform, inasmuch as it contains an equivalent of chlorine less. But the safety is relative, not absolute. (Dr. B. W. Richardson, p. 369.)

CHLORAL.—Hydrate of chloral is by no means an anæsthetic. As a producer of sleep it is, however, in many respects unrivalled, even by opium. The sleep produced is light and refreshing, provided it is given in moderate doses. It is unnecessary and dangerous to give above twenty or thirty grains at a dose. A dose of fifty grains has been known to produce very serious symptoms. It generally fails to relieve severe pains of a purely neuralgic character, but there is a good deal of evidence to prove that it relieves suffering where the affected parts are tense, and mere arterial throbbing counts for much in the production of the pain; thus it has been very favourably spoken of for its effects in gout. It seems likely that in delirium tremens, with the choice of two such weapons as bromide of potassium and chloral, we shall be able almost entirely to dispense with the use of opium. In the sleeplessness which precedes puerperal mania, chloral is probably an unequalled remedy. In melancholia its action appears to be powerful and remarkably sure. (Editor of Lancet, p. 337.)

There are no special contraindications to the employment of chloral when used for somniferous purposes. Even in head and chest affections, in which opium is inadmissible, chloral

may be used with perfect success. It is a most valuable anodyne in cases of neuralgia, hysteralgia, dysmenorrhœa, pleurodynia, &c., and in the pains attendant on cancer and acute local inflammations. In cases of chorea, and threatened or incipient insanity, I have exhibited it with benefit. In continued fevers it will procure sleep and reduce the pulse, and it may be given with benefit in acute mania, delirium tremens, and asthma. (Sir J. Y. Simpson, p. 338.)

Chloral sleep is much more natural than that produced by opium. In both, as in natural sleep, the pupil is contracted to the utmost, but in chloral sleep the pupil immediately dilates on awaking, just as it does in natural sleep. This is not the case with opium sleep. Again, the chloral sleep is more natural in this respect—that the sleeper may be aroused at any time, and at once recovers the full use of his functions. (Dr. J. B. Russell, p. 353.)

Chloral will almost instantly produce sleep where the brain is functionally or organically disturbed, but acts with great uncertainty upon a sound brain where pain is the exciting cause of sleeplessness. (Mr. A. M. Adams, p. 347.)

The action of chloral is somewhat uncertain, and for a first dose not more than twenty grains should be given. A larger dose may produce too prolonged sleep, and cause alarm to the patient's friends. In the case of persons accustomed to a good deal of alcohol, larger doses are generally required to produce the same effect as on persons of temperate habits. (Dr. H: Maund, p. 341.)

Chloral is a valuable adjuvant to chloroform and opium—for instance, a less dose of morphia is required if a little chloral is administered at the same time; and when a patient is under the influence of chloral a few drops of chloroform produce complete anæsthesia, whereas without it a considerable quantity might be required. This latter fact is likely to be of great importance in surgical and obstetric practice. (Mr. L. Tait, p. 344.)

Strychnia an Antidote to Chloral.—Strychnia administered after a too heavy dose of chloral, shortens and destroys the effect of this substance, yet without producing the injurious action which it exhibits in ordinary cases. The strychnia should be given hypodermically. (Dr. Liebreich, p. 342.)

If two rabbits are injected with strychnia, but one of them previously with chloral, the animal injected with strychnia alone speedily dies from tetanus, whilst the other shows no appearance of spasm and is speedily well. Of course, the

doses must be proportioned to each other, and it is necessary that the chloral should be administered first, as it is absorbed more slowly than the strychnia. (Dr. Liebreich, p. 343.)

CHLOROFORM.—*Prevention of Death from.*—If an animal be placed in an atmosphere highly charged with chloroform, its respiration will be observed to become fainter and fainter, and finally to cease. If the chest is opened the lungs are found collapsed and bloodless, but the heart is still acting. Hence we infer that the one thing required in the human subject, when death is threatened from chloroform inhalation, is artificial respiration. This respiration ought to be of the gentlest kind; there ought to be no rough movements or manipulations of the chest, which can only tend to further paralyse the enfeebled action of the heart. Long ago Dr. Snow advised that inflation should be effected from mouth to mouth. The little india-rubber bellows invented by Dr. Richardson (described in this volume) promises, however, to be a most efficient instrument for the purpose. It can be procured for ten shillings, and can be worked by one hand. (Editor of Lancet, p. 356.)

Influence of Chloroform in Promoting Cutaneous Absorption.—Chloroform, or better still, chloroform diluted with two or three parts of alcohol, has a wonderful power when holding in solution some medicinal substances, as aconitine or atropine, of causing rapid absorption by the skin of that substance when applied in contact with it. Tincture of aconite applied alone upon the skin will not produce any appreciable effect, but mixed with an equal quantity of chloroform the skin will become pale and insensible to the prick of a pin; in fact, superficially paralysed. This does not occur if the chloroform is used alone, at least nothing to the same extent. (Dr. A. Waller, p. 359.)

ELECTRICITY.—*To Charge a Patient with Electricity.*—Place the patient upon a glass-legged stool, and connect him by a brass chain with a powerful frictional electric machine. He may now be thoroughly charged with electricity, without any unpleasant sensation to himself beyond a feeling as if his hair were "standing on end." If he is touched with the knuckle anywhere a spark will be drawn from that part. It is astonishing what this will do in certain cases. It will sometimes remove in a few seconds a tic that has lasted for days. Pain in the sciatic nerve, many odd and disagreeable sensations, unpleasant flutterings about the heart, depending on weak innervation, and tremor of the limbs, may all be removed by simply "charging the patient." (Dr. J. R. Reynolds, Lancet, March 5, 1870, p. 331.)

ETHER AS A STIMULANT-SEDATIVE.—Sir Frederick Pollock, who has now attained the advanced age of eighty-six, has communicated, through Sir James Alderson, his experience of the benefits to the aged resulting from the inhalation of the best rectified ether. Sir F., besides a certain amount of indefinable nervous malaise, suffered specifically from gastric flatulence and painful spasm, occurring almost constantly during meals. He inhaled the ether from an ordinary bottle applied to one nostril, and soon found that a few strong whiffs taken in this manner were sufficient at once to quiet spasm and pain, and to induce a general tranquillity of the nervous system. He did not find consciousness disturbed, but the intellect tranquillized and fortified. It is probable that ether inhaled in small quantities may prove a better stimulant wherewith to soothe the nervous system of the aged, than either alcohol, tobacco, or opium. (p. 390.)

GLYCERATE OF TAR.—Glycerine is an excellent solvent of the medicinal properties of tar, and serves as a valuable adjunct to the latter therapeutically. Each fluid ounce of the glycerate should represent thirty grains of tar. A formula for its preparation is given. (Mr. J. B. Moore, p. 222.)

METHYL-ETHYLIC ETHER.—This is a new anæsthetic introduced by Dr. Richardson. It is a gas, produced by mixing one part of sulphuric acid with two of pure methylic alcohol, and applying heat. It is fixed by absorption by pure ethylic ether. Two drachms of this ethylic ether saturated with methylic is sufficient for anæsthesia. The action of this anæsthetic is very rapid, and there is never spasm, syncope, or asphyxia during inhalation, or any after nausea. The chief peculiarity of its action is that in all cases there is a semi-consciousness, so that the patients do what they are told to do, remember what has been done, but still are not conscious of pain. This ether produces no excitation of the nervous centres which supply the vascular system, as chloroform does, and consequently there is absence of muscular spasm, of contraction of bloodvessels, and of syncope from fatal contraction of the heart. For short operations this anæsthetic will probably be peculiarly valuable. (Dr. B. W. Richardson, p. 369.)

MORPHIA.—*Dose of Morphia for Subcutaneous Injection.*—A quarter of a grain of morphia is as a rule an unsafe dose to commence with. A third of a grain has caused dangerous symptoms in fifteen minutes, and in a case of mania half a grain has proved fatal. (Dr. E. T. Wilson, p. 374.)

NEW SUBCUTANEOUS INJECTION SYRINGE.—M. Dieulafoy has brought before the Imperial Academy of Medicine at Paris a modification of the subcutaneous injection syringe, by which its uses are immensely extended, especially for the purpose of evacuating deep-seated abscesses. The needle can be shut off from the syringe by a stop-cock, and there is also a short projecting tube at the needle end of the piston and at right angles to it, also closeable by a stop-cock. By alternately opening and closing these cocks a deep-seated abscess, or one situated in a joint, may be completely evacuated, or the air drawn off from a strangulated hernia. Pleuritic or even pericardial effusions might in a similar manner be removed. The needles used are so delicate that they can be introduced into many internal parts without injury. (p. 392.)

NITROUS OXIDE GAS AS AN ANÆSTHETIC.—There appears to be no reason why nitrous oxide gas should not be extensively used in general surgery as an anæsthetic, and many important reasons why it might be so used. The first of these is its safety, secondly, the rapidity with which anæsthesia can be produced, thirdly, the anæsthesia can be prolonged as long as wished, and when the anæsthetic is withdrawn, its effects pass off very rapidly, and there is no after discomfort of any kind. There is no difficulty whatever in maintaining anæsthesia as long as desired. (Mr. C. J. Fox, p. 364.)

Nitrous oxide gas is of necessity a bad agent for anæsthetic administration. All atmospheric air is excluded during inhalation, and if inhalation is continued beyond a given period, even for a few seconds, it must of necessity produce fatal results. (Dr. B. W. Richardson, p. 370.)

POISONING BY TINCTURE OF ACONITE.—The plan of injecting liquor ammonia into the veins, found so successful in cases of snake-bite, appears likely to be of service in cases of poisoning by other substances. An interesting case of poisoning by aconite is related, in which the successful termination appeared to be materially assisted by this treatment. (Mr. B. W. Richardson, p. 384.)

PRACTICAL MEDICINE.

DISEASES AFFECTING THE SYSTEM GENERALLY.

ART. 1.—THEORY OF CONTAGION.

By the Editor of the BRITISH AND FOREIGN MEDICO-CHIRURGICAL REVIEW.

If we confine our attention exclusively to those general diseases which are ordinarily contagious, we shall find *two groups* among them, separated by very distinct characters. 1. In one of these the cause of contagion seems to be a poison derived immediately from man, or from one of the lower animals, and to which we may fitly apply the term *virus*. The best examples of this group are puerperal fever, plague, variola, varicella, and vaccinia; syphilis, malignant pustule, glanders, farcy, and rabies. It will be seen that the majority of these viruses are derived from the lower animals, and are mere exotics in our race. The two which are apparently of human origin—puerperal fever and plague—are produced by decomposition of animal matter; we need not dilate on the evidence as to the former, while Griesinger teaches us that plague in Egypt was owing to the careless burying the dead in that country, and has ceased since improvements were made in this respect.

The viruses are able to retain their properties for a considerable length of time when dried, but are always most active when recently produced. For, with one or two apparent exceptions, they seem to require an actual wound in order for them to enter the body; they are the inoculable diseases "par excellence." After inoculation, local action in the wound precedes infection of the system at large, and in the few instances in which we can follow the course of the poison, it passes through the lymphatics.

Considerable light may be thrown hereafter on the nature of the virus diseases by the study of the analogies which exist between several of them, and certain non-contagious diseases. Thus, Griesinger insists with reason on the similarity between the symptoms of plague and those frequently produced by

dissection wound; rabies finds its analogy in snake-bite; and the connection between puerperal fever and pyæmia is close, though ill understood.

It is to the group of viruses (we would suggest) that Dr. Richardson's theory of an animal poison acting catalytically is applicable. We have already referred to his discovery of a special alkaloid—"septin"—in pyæmia; and in like manner Schlossberger has discovered an alkaloid in the German sausages which produce botulism; the active principle of another animal poison, cantharidine, can likewise be isolated chemically. These analogies would seem to imply that the viruses are not living cells, and that, in the cases where a peculiarly rapid formation of cells is noticed, that is a symptom, and not the essential cause, of the disease. We are reduced to more or less probable conjecture as to the physical nature of the viruses, for the results of direct experiment are somewhat doubtful. On the one hand, M. Monoyer succeeded in vaccinating children with matter which had been repeatedly filtered until nothing could be detected in it with the microscope; but, on the other, the more recent and careful experiments performed by Chauveau go to prove that the poison in vaccinia, variola, and glanders is contained in the solid constituents of the pus. The passage of the poison, in several of these diseases, through the lymphatic glands, would seem to imply that it is a liquid.

2. But there are several contagious diseases which are distinguished from the viruses we have just described by very marked characteristics. In the case of cholera, for instance, it is almost demonstrated that the poison, though contained in the morbid excretion, is harmless at the moment of leaving the body, and developes its properties afterwards when in contact with decomposing organic matter. We have no evidence of transmission of the disease by inoculation, or by mere contact; all we know of it leads us to the belief that it is only acquired by swallowing the poisonous substance. Local action does not appear to precede the infection of the whole system, nor do the lymphatics and their glands seem to be the channel through which the poison travels. The frequent epidemics of the disease are owing, probably, to a fresh formation of the poison under certain climatic conditions of heat and moisture, and contamination of the drinking water by sewage; the last cause being the only one absolutely required to spread the already developed disease. The same causes which breed true malignant cholera, and favour its extension, are capable of producing the non-contagious, milder affections of simple cholera and diarrhœa.

Almost all the above description is applicable to enteric fever, dysentery, and yellow fever, as well as to cholera, the

"frustate," non-contagious forms of dysentery and yellow fever being well-known; and simple continued fever, febricula, &c., bearing the same relation to typhoid.

None of these four diseases seem to be produced by an animal virus; nay, it is certain with regard to all but enteric fever, and highly probable in that case, that they are often produced afresh entirely outside the living body, under the following circumstances. They are most common in summer and autumn; heat and moisture especially favour their development, and the presence of decomposing animal or vegetable matter is essential.

These conditions are strongly suggestive of the existence of some low forms of fungi; and in the case of cholera, which has been most carefully studied, we seem to be on the verge of proving this to demonstration. With regard to yellow fever, Griesinger, who is usually most careful to avoid any conjecture, believes that it is the strongest instance for the existence of a living miasm as a cause of contagious disease. The harmlessness of cholera dejections when fresh, and their acquiring injurious properties after mixture with impure water, seem to imply that the cholera poison does not pass through all its life changes either within or without the body; this is the more noteworthy, as the substance may exist in totally different forms in different stages of its existence, and may be, therefore, very difficult to identify. The existence of the non-contagious frustate forms of each of these diseases is probably to be accounted for by a change in the quantity or quality of the fermentible matter, as we know this to be the case with the lower fungi. It may be well to caution the reader against supposing that the active principle in fermentation need always be a fungus; M. Pasteur has shown that the production of butyric acid by fermentation is accompanied (and, he believes, caused) by an infusorial animalcule.

This is a brief summary of the grounds for our belief that the animal virus and fermentation theories of contagion are both true, and err only by seeking to explain every case. In one series of diseases, we believe the infecting principle to be a *virus* of animal origin; in another series we think it is a living *miasma* (if we may thus employ a much abused word) produced originally outside the body, but becoming afterwards capable of development within it.

We, of course, choose only the most striking examples of each kind to illustrate our opinion, but we think that all contagious diseases can be classed under one or other of these heads; and, when this is done, the majority will be found to be viruses. Thus, the poison of pertussis is probably inhaled, and acts on the same nerves as that of rabies; it apparently

needs to develope locally in the lung during the first stage of the disease, before infecting the whole system. Scarlatina and measles are most likely viruses, as is evidenced by the inoculability of the latter at least, and by their general resemblance to variola and varicella. The incubation stage is looked upon by Niemeyer as the strongest proof of their miasmatic nature; but it is also to be explained as being required for the process of local action of the virus. The production of measles by mouldy vegetable matter is a serious objection to its being due to a virus; the examples have been so few, that we may fairly doubt if the disease thus caused was true ordinary measles.

Typhus, again, is so independent of climatic conditions, and so evidently connected with dirt and overcrowding, that there can be little doubt it is due, not to a miasma, but to a virus, producible "*de novo*," like rabies or plague. The symptoms produced by botulism (German-sausage poisoning) are analogous to those of typhus, and appear after an incubation period of from eight to fourteen days.

We have dwelt at such disproportionate length on what may appear to be a speculative question, because it seems to us that the present confusion of all the phenomena of contagion under one common cause is the chief source of the misunderstandings and controversies which prevail. We will merely add, that possibly science may hereafter prove that animal viruses are also living cells; in that case the distinction of *origin* between these and the miasmata would still exist.—*British and Foreign Medico-Chirurgical Review, Jan.* 1870, *p.* 128.

2.—ON THE PROPAGATION OF ENTERIC FEVER.

By Dr. T. Clifford Allbutt, M.A., Cantab., F.L.S., Physician to the Leeds General Infirmary.

I think it is not yet clearly understood by the profession at large that enteric fever is a specific fever, and therefore must, in accordance with all analogy, depend upon a specific poison. We see many accounts of epidemics—accounts which are drawn up with industry and intelligence, but which fail to tell us the origin of the specific poison. The drinking of polluted water is shown, the entrance of drain-refuse into the wells is proved, but the farther problem is too often overlooked—the problem of the introduction of the peculiar poison. It is, however, quite certain that persons may drink fæcal water for months or years, their cesspools may communicate with their wells, their drains may find a way into their water-pipes, and, in consequence, they may suffer from diarrhœa, from low forms of sore throat, from debility, languor, and from other evidences

of low vitality, but they do not suffer from enteric fever, unless they drink the specific poison of that disease which may or may not be present in the cesspool or drain, and which certainly is not there unless it be introduced from without. Enteric fever is not caused by the drinking of fæces, whatever else this may produce, but by the drinking of a specific poison whose chief place of development is the infected human bowel, and which is, therefore, often found in human dejections. Unless that element be traced, the origin of the endemic is not discovered. Here, for example, is one of the difficulties which waits for settlement. Can the enteric poison which is known to be carried by water into the system be carried also by the atmosphere into the lungs and blood? Many writers hold that this latter is a means by which the endemic spreads. It is always hard to prove a negative, still more so to prove a negative in a question of such subtlety; the right course is rather to extend, as far as possible, the positive proof of that means which we know; viz., the introduction by water, and to find out whether it will cover all cases.

It seems to me very doubtful whether it will cover all cases. In large towns like Leeds, for instance, where the water-supply is uniform, continuous, and excellent, and where enteric fever is nevertheless prevalent, there would seem to be some farther means at work. For instance, I go frequently into infected houses where the water-supply is all that can be desired, but where there is a strong ventilation from the sewers. In such cases it would certainly seem as if the poison were light enough to be borne upon the wind and thence either breathed or caught in the food. Again, there seems to be some widely spread influence which determines the periods of the endemic. Individuals, or their excrement, must be moving from place to place and carrying infection all the year round; but yet we see endemic outbreaks chiefly in autumn, and their subsidence chiefly in spring. The ground-water levels seem to have much to do with this, probably in some mechanical way; and it is certain that rains have much to do with it, as we see in one of the cases I shall now publish, as was seen in the Dundee outbreak so well described by Dr. Maclagan in the *Edinburgh Medical Journal* (Oct. 1867, p. 297); and at Terling also, as was shown in the reports of Dr. Haviland in the *Medical Times and Gazette* for January 11th, 1868; and of Mr. Salter in the same journal for the 7th of March. The fall of rain, acts no doubt, by washing the infecting material into the springs and water-courses. That personal contagion has little or nothing to do with the spread of the disease is now believed by all careful and instructed writers. That mere accumulation of dung and filth has no direct causative power is less clearly seized as a truth;

and the hesitation which is felt on this point is now explained by the fact that the poison (whether parasite or not, as Fischer and Hallier have attempted to show,) certainly battens upon excrementitious filth and organic putrefactive matters. In large towns, where many and complex agencies are at work, it is difficult or impossible to trace the beginning and causation of endemics or epidemics, except it be under circumstances so crucial and peculiar as those of the Guildford outbreak. It is in small societies, the circumstances of which are simple, that such investigations are most likely to prove successful. In two such cases, I have been able to trace the origin of enteric fever, and these cases I have now to bring forward. The first case, in point of time, was that of a college belonging to the Society of Friends; it is called the Flounders Institute, and is situated at Ackworth, near Pontefract. The following is the report which I was enabled to make with the kind assistance of Dr. Wood.

"At the request of Mr. Harvey and Mr. Brown, I visited the Flounders Institute on April the 16th, 1869, in order to ascertain the nature of the fever now prevalent at the Institute and in Ackworth, and in order to learn, if possible, the causes of its prevalence. I met your medical attendant, Dr. Wood, accordingly; we visited several patients at the Institute, and I ascertained that the disease from which they were suffering was enteric fever. That opinion you had already heard from Dr. Wood. We also visited several patients in Ackworth Moor Top, and ascertained they also were suffering in like manner from enteric fever. As is commonly the case, it had fallen chiefly and firstly upon young persons.

"As regards the Institute, I found your conditions as to site, and aspect, and internal comforts, to be most satisfactory. My survey ended, as is common in these cases, by my suspicions falling upon the drinking water. I found that your supply was from two sources. 1. From a well upon your own premises; 2. From a well in the village, to which I shall refer under the name of the watering troughs. First, as to your own well. It appears that this water has been little used for drinking purposes. You have not any cesspool in dangerous proximity to it, your drains are constructed with sanitary tubes, and I do not think it likely that the excreta from the fever-patients in your house have reached your well. I shall show reason for believing that they all derived their poison from one common source; viz., the watering troughs.

"The analysis of your well-water, made by Mr. Wilson of the Leeds School of Medicine, shows that it contains 1·82 grains of organic and volatile matter per gallon, and 4·9 grains of common salt. On the whole, though somewhat unsatisfactory,

it may safely be used, provided it be exposed to the air so as to allow the sediment of oxide of iron in combination with organic matter to be fully formed, and that it be then filtered. Mr. Wilson holds the same opinion, and recommends the use of a carbon-filter.

"I now turn to the water at the watering troughs. It appears that this water, which is very bright and pleasant, has been chiefly or entirely used for table purposes in your household. As your Institution is conducted upon the principle of total abstinence, this village water has been largely consumed by your inmates. The watering troughs supply a favourite drinking water not only to yourselves but also to that part of the village of Ackworth called Ackworth Moor Top. It is a remarkable fact, which I hear from Dr. Wood, that those persons in the village who have suffered first and most severely are also total abstainers, and have drunk largely of the attractive water of the troughs. The watering troughs and the small well or drinking trough a little above them, are supplied from one stream, and the analysis of the water, as made by Mr. Wilson, is as follows: 'The water from the spring at the watering troughs is inodorous, very bright and clear, and has a scarcely perceptible saline taste; it forms no deposit on standing. An imperial gallon contains 5·04 grains of organic and volatile matters and 6·21 grains of common salt. Nitric acid, which is a product of the decomposition of animal matter, is present in unusually large quantity It will be clear to you from the above analysis that the water of the troughs is, in spite of its beautiful appearance, very impure. The area of the enteric fever is curiously conterminous with the area supplied by the troughs, only one case having occurred outside this area, and that one was a boy who passed by the impure well twice daily and frequently drank the water. On examining the troughs with Dr. Wood, I found below your gates and across the road two large troughs, and a short distance above these troughs another small trough. On inquiry, I found that a stream was known to cross the high road reaching the well-trough from a point about thirty yards higher up. We crossed the road and walked some yards up the road, where we found a clump of cottages. In the midst of them is an open space, and in this space is a pump which is never dry, and the water of which, we have no doubt, is a branch of the stream which supplies the troughs. Now the space occupied by these cottages is the site of an old stone-quarry, which has been filled up with loose earth and rubble, Some parts of this quarry, and, for example, a part now occupied by a privy, had been worked and filled up again within the last ten years. These cottages, therefore, stand in a sort of amphitheatre,

sheltered behind by the walls of the quarry. At the back of these premises is a pool supplied constantly by running water; this is, we proved, the main source of the stream which supplies the troughs. This stream runs by several channels through this basin of excavation, the channels themselves then combining to form a main stream which supplies the watering troughs. The basin is filled with porous made earth, upon which again are placed six or eight dwellings, with foul privies, &c. To give some idea of the rapidity of percolation, I may say that on the day of my visit a heavy rain was falling. Surface-water, at the close of the shower, was standing in the hollows of the soil behind the cottages. In less than an hour nearly the whole of this rain-water had disappeared; and, I may add also, a certain sump-hole which receives the surface-drainage, &c., was never emptied, for 'it emptied itself' by escape into the soil below. This sump-hole lies just above the calculated run of the stream going down to the troughs.

"It appears that the first case of typhoid fever in your district was that of a girl named Lee. She soon fell ill of fever after her return from a village near Wakefield. Lee lives in one of the cottages which are built in the stone-quarry. During the first day or two of her diarrhœa, the dejections were cast into the privies behind the cottages, and upon the made earth. After that time, the people buried these dejections in the loose earth which fills the old quarry, and below which the stream runs to the trough. This case occurred during the winter months, and at a time when much rain was falling. The rain, soaking through the loose ground in the way I myself witnessed, would enter the stream, and would carry with it the whole of the typhoid excreta. These excreta were then carried by the stream itself into the stomachs of the inmates of your household."

The next outbreak which I was called upon to investigate was with Mr. Ellerton, of Aberford, and it occurred at Bramham College, a large school near Tadcaster, under the management of Dr. Haigh and his sons. This report is as follows:—

"On the 10th of May, 1869, I was consulted by you concerning an outbreak of fever which had recently taken place in your establishment. From the evidence which I obtained from Mr. Ellerton, I was satisfied that the fever was of the kind known as enteric. I felt satisfied also that the appearance of enteric fever in the college was due to introduction from without. It appears that, in the latter half of the month of March nineteen of your boys sickened at once with symptoms that afterwards developed into those of well-marked enteric fever. It seemed clear, therefore, that these boys were subjected to some common cause of disease. My attention was at

once directed to your water-supply. A suspicion of the water had already presented itself to Mr. Ellerton and yourselves; and you were exploring the state of your supply. I found that your drinking-water was taken from a surface-well on your premises. Having, then, a well liable to pollution, was any pollution by the specific excreta of enteric fever to be detected? I believe that, with your assistance and the assistance of Mr. Ellerton, I am enabled to answer both these questions in the affirmative. A specimen of the well-water, however pleasant for drinking purposes was, (as shown by analysis) contaminated by sewage-matter. It became important, then, to find the origin of this contamination. In close proximity to your well was a soft-water tank, cemented inside. The cement, however, was shelling off on the side next the well; and that there was soaking going on from the tank into the well was clear from the distinct discolouration which was found on the stonework of the well contiguous to the soft-water tank, and in no other part. It was discovered that the water in the tank was contaminated by sewage matter, by means of a drain formed of sanitary tubing which runs over the top of the soft-water tank on its way from a water-closet to the sewage-tank. At the spot where it passed over the tank, this tubing was broken (owing to its having been undermined by rats and so let down), and the whole ground above the arched roof of the tank was saturated with filth. Inside the soft-water tank at the spring of the arch, and just below the broken drain, were found two cracks, through which there were evident traces of the dripping of sewage into the tank. Your well was, therefore impregnated with sewage through the intermediation of the soft-water tank.

"It only remains now to discover the source of the specific infection. You tell me that at the end of last January you received two boys, who sickened about nine days after their arrival and developed all the symptoms of enteric fever. It is in accordance with the time of the incubation of enteric fever (which is seldom or never less than ten days, and generally more), that these boys should have received the poison into their systems before coming to you, for fever was prevalent in the localities from which these boys respectively came; in fact, enteric fever was present in the home of one of the boys. These boys had the diarrhœa characteristic of enteric fever; and I find that their excreta were thrown down the water-closet generally used in cases of sickness. The broken drain found above the soft-water tank was the drain from the water-closet. The whole case is therefore singularly clear, and the remedy as clear as the causes."

Both these cases tend, I think, to prove with unusual clear-

ness that water charged with sewage-matter had long been drunk daily with impunity, so far as enteric fever was concerned, until the moment when the dejections of an enteric patient passed into it. At Terling the people had long been drinking water horribly charged with organic matter and bowel dejections, and without the fever as a consequence, until one young girl commenced the specific process; her dejections were washed by heavy rains into the wells, and then only did the endemic spread among the people.—*British Medical Journal, March* 26, 1870, *p.* 308.

3.—BELLADONNA IN THE TREATMENT OF TYPHOID FEVER.

By Dr. B. KELLY, Dublin.

Without entering into the fruitless question as to whether fevers be due to specific germs or to pythogenic fluids or gases, all of which, up to the present, have failed to be detected by the microscope and the most searching chemical tests, I would merely state that my own convictions lean strongly to the theory that this class of diseases owe their origin to the introduction into the circulation of septic vapours or gases, and that these subtle agents (fomites) are not unfrequently developed on the surface of the bodies of the individuals subsequently tainted by them. Hence the prevalence of these maladies among the poor and all those who from ignorance or other circumstances, ignore the practice of frequent ablutions and personal cleanliness. But more, there must exist, as a *sine quâ non*, a predisposition on the part of the patient, as well as an exciting cause for the effectual production of fever. Now, of all the predisposing elements, there is none, perhaps, more powerful than poverty, with its concomitant train of filth, squalidness, and misery.

The treatment of fever has been as conflicting and diversified as have been the opinions of physicians respecting its pathology. When the inflammatory theory was in vogue, bleeding, blistering, and purging were pressed into service with terrible effect, as shown by the awful mortality which attended this form of treatment. And it has not seldom happened that the disease had been mistaken by a similarity in outward appearance with the phenomena of some local phlegmasia, and doctored accordingly, as we have good reason to suppose, judging from the lesions presented in post-mortem examinations. No one can read the clinical works of Broussais without being seriously convinced of the truth of this statement. Now, that the zymotic, or putrid, and germinal theories reign supreme among

the more orthodox members of the profession, the antiseptic plan of medication, based, as I believe it to be, upon sounder pathological doctrines, has superseded the more heroic method alluded to, and, comparing the results of both, with decided benefit to patients.

The treatment which I now propose has neither been predicated by the inflammatory nor yet by the zymotic nature of the disease, and consequently cannot be styled either antiphlogistic or antiseptic, at least in the ordinary acceptation of these terms; and yet, viewing it in the light of its action in preventing congestions and inflammations and dissipating the putrid epiphenomena of fever, it well deserves the title of both.

Nearly six years have now elapsed since I recommended, on physiological grounds, belladonna in the treatment of enteric fever. During this time ample opportunity has been given me of testing its therapeutic virtues. Believing firmly, as I did in the correctness also of the pathological deductions upon which the new treatment was especially based, I entered, I must confesss, upon the trial with rather sanguine hopes of success. Never, I can say, have expectations been more fully realised or crowned with happier results. Indeed, the greatest difficulty I now find is to speak of it in such a way as not to detract from its merits by false moderation, or, by falling into the opposite and equally reprehensible extreme, to puff it up with unbounded praise. Suffice it to say that not more effectually is the tetanic action of strychnine on the system neutralised by tobacco and woorari, or paludal fever combated by quinine, or anæmia removed by chalybeates, than is the poison of typhoid counteracted by belladonna. It completely changes the whole character and outward manifestation of the disease. Delirium, coma, and subsultus quickly vanish, and are succeeded by calmness and clearness of the intellect, by natural sleep, and complete control of all the voluntary muscles. Diarrhœa is checked, and healthy consistent evacuations are established. The appetite, if excessive or deficient, is restored to something like a normal standard. The pulse, from being frequent, fluttering, and compressible, is rendered slow, strong, and equable. The morbid temperature of the body—the *calor mordax* of Roman, the *causus* of Greek physicians—falls to a natural level. The vital changes induced in the blood, glandular and other organs, as shown by passive hemorrhages, tenderness of the abdomen, hypostatic congestions, and ulcerations, are all arrested *in limine;* and the deranged functions of the economy return to their original equilibrium, and are performed with the same regularity as in health. The patient, after an inconceivably short space of time, usually from twenty-four to forty-eight hours after the first administration of the

remedy, wakes up, so to speak, and pronounces himself as well as ever; and indeed, to look at him, he really appears so. If, however, the physician be not thoroughly on his guard, and do not keep the patient quiet in bed pending the ordinary course and duration of the disease, serious consequences will almost inevitably follow. This precaution is all the more necessary, as both the patient and his friends often become clamorous, and, unless gifted with more than a usual share of charity and subordination, may impute sinister motives to the ill-starred medical attendant. Under such circumstances he should never neglect to impress upon them the important fact that, favourable appearances to the contrary notwithstanding, the disease must run a certain limited course; and that relapses, always dangerous in themselves, are only to be prevented by watching the patient closely and combating untoward symptoms as they arise. These tactics I have never known to fail. Now a word as to the proper time and mode of administering belladonna.

When called to see a patient in fever, I usually wait, if it be yet in its incipient stage, till all or most of the prominent symptoms are well developed before I venture to prescribe the drug. By doing so, I have the advantage and gratification of witnessing its effects in all their physiological force, while I avoid the possibility of making a mistake in diagnosis. If the patient be an adult and vigorous, I do not hesitate to give from twenty to twenty-five drops of the officinal tincture of the British Pharmacopœia every four hours. This dose must necessarily vary to suit individual ages and constitutions. The following is the formula I generally employ:—℞. Tinct. belladonnæ ʒ ij., syrupi aurantii ℥ss., aquæ menth. pip. ℥ vijss. Ft. mist. Dosis: Pars sexta omni quartâ horâ sumenda. As the whole of this mixture is usually consumed in twenty-four hours, and as it is repeated with little or no variation day after day, for generally not less a period than two weeks, we may well imagine the enormous quantity of the narcotic that may be used with impunity, especially when the system is fully under the influence of an agent like the poison of typhoid fever. I have never known anything more serious than moderate dilatation of the pupils (which I look upon as an admirable criterion of the safety of its therapeutic action) and slight dryness of the fauces to attend its administration.

The most remarkable effects of belladonna, perhaps, are shown by the suddenness with which the patient recovers his intellectual faculties and the full power and control of his muscles. The latter he often takes pleasure in exercising by rapidly flexing and extending his arms—a circumstance which he adroitly wields as an argument in his appeals to the physi-

cian to allow him to get up and resume his ordinary vocation. All this was well exemplified in a stalwart Englishman, a patient of Dr. Samuel Giles, of New-cross, Deptford, whom I attended as *locum tenens* a little over a year ago.

As belladonna completely prevents the specific lesions in all the tissues and organs of the body naturally consequent upon the absorption of the typhic poison, it becomes an important question to decide whether the patient is rendered obnoxious or not to subsequent attacks. This is an enigma which neither experience nor observation, so far, has enabled me to solve. Reasoning, however, from analogy, we may expect the disease to reappear, if at all, under a modified and milder form.

When is it safe to withhold the belladonna from the patient? As nervous symptoms, resembling those following the sudden suspension of an habitual stimulant, are apt to supervene upon the abrupt cessation of the drug, I deem it prudent, after the disease has continued about twenty-one days, and the eruption and other accidents have entirely disappeared, to diminish the dose, and extend the intervals of its exhibition gradually. This may be safely and conveniently done during the whole period of convalescence.

As regards the matter of stimulants, I absolutely interdict them in every form and shape to patients while under the treatment of belladonna, as one of my objects is to see that neither its action is masked, nor its virtues rendered doubtful, by the complexity of remedial agents. I occasionally permit a teaspoonful or two of milk punch to be given at long intervals, certainly not with a view of thereby benefiting the patient very materially, but as a *placebo* covertly addressed to the minds of over-anxious friends.

The regimen of patients, while under treatment, should be attended to with the most scrupulous care, as the slightest excess, either in eating or drinking, is sure to be followed by an attack of indigestion and an aggravation of all the febrile symptoms. I have found the following bill of fare to answer admirably in most cases:—A quart of soup made from cow-heel and a pound of beef; a pint of milk boiled with arrow-root; an ounce of cocoa prepared in a pint of milk. These, together with a slice of toast, and a little salt and pepper, constitute the ordinary daily rations for an adult. The proportions given must of course vary in many cases, but the articles themselves will be found well adapted to the debilitated powers of digestion commonly arising in the course of continued fever.—*Medical Times and Gazette, Feb. 5*, 1870, *p.* 146.

4.—ON RELAPSING FEVER.

By Dr. CHARLES MURCHISON, F.R.S., Physician to the Middlesex Hospital.

[For many years this fever has been unknown in Britain. The first case for fifteen years was admitted in July, 1868. Since August, 1869, it has spread rapidly. Although the fever is undoubtedly contagious, and probably was imported from Germany, it is the very poorest of the population only who are attacked with it.]

It is with the symptoms of the disease that we are at present more especially concerned. The prominent symptoms, then, of relapsing fever are: pyrexia, setting in suddenly, with rigors or chilliness; great frequency of pulse and heat of skin, but no specific eruption; severe headache and general pains, but mind usually clear; pain, tenderness, and enlargement of the liver and spleen; rapid breathing; vomiting more or less urgent, and frequently slight jaundice and constipation: an abrupt cessation of these symptoms about the fifth or seventh day, with copious perspiration; but after a complete apyretic interval, during which the pulse may be unusually slow, and the patient may have a good appetite and be up and walking about, an abrupt relapse on or about the fourteenth day from the first commencement, or sometimes later, running a similar course to that of the first attack, but terminating on or about the third or fourth day of the relapse. The disease is very rarely fatal, except in persons whose constitutions are weakened by previous illness; but it is a much more painful malady than typhus, which so commonly ends in death. Such is the clinical history of relapsing fever in a typical case. There are many variations as regards the duration of the febrile paroxysms.—*Lancet, Jan.* 22, 1870, *p.* 109.

5.—ON SCARLATINA.

By Dr. WALTER FERGUS.

[Whenever an epidemic of scarlatina occurs the cry of the public at once is for better sanitary arrangements, improved drainage, better water supply, &c. If, however, we turn to the Ninth Report of the Medical Officer of the Privy Council, we find returns from twenty-four towns, widely spread and differing from each other in many social as well as sanitary respects, and these reports prove beyond doubt that the sanitary precautions named are perfectly inoperative in preventing the spread of scarlatina.]

I propose in this paper to put together some facts relating to scarlatina, which have come under my notice in a somewhat extended observation of that disease.

In the first place, I would observe that popular notions, preconceived ideas, and theories hastily adopted, and perhaps enforced with authority, are not likely to lead to a true solution of the mystery which attaches itself to scarlatina above all other diseases.

An outbreak of scarlatina takes place. At once bad drainage, insufficient nourishment, overcrowding, or some such defects, are said to be the cause, not only of the spreading of the disease, but of the disease itself. It is not too much to say that defective sanitary arrangements are universally held to be a cause of scarlatina. Valuable beyond price as these improvements are, in regard both to the general health and to the social and moral well-being of the population, they are proved to be inoperative in arresting the development and march of scarlatina. To make this point unequivocally clear, we have only to turn to the Ninth Report of the Medical Officer of the Privy Council. There we find returns from twenty-four towns, wide spread, and differing from each other in many social as well as sanitary respects. One uniform testimony is borne to the utter powerlessness of improved drainage, better water-supply, and every other sanitary improvement in respect of scarlatina. Taking the aggregate of the towns since the introduction of sanitary improvements, there has been an increase in the scarlatina death-rate of upwards of 1 per 10,000 of the population. [An accompanying table shows at a glance what has been the mortality from this disease before, during, and after the execution of the works.] In 11 of the towns, during the progress of the works, scarlatina *decreased*, and in 12 it *increased*. The average decrease was only 4·31, while the increase averaged 8·85. After the works had been completed, and in operation for from four to eight or nine years, the scarlatina death-rate increased in 13 of the towns to the amount of 71·26 deaths, giving an average of 5·5 for each town; on the other hand, it decreased in 10 towns to the amount of 32·57, averaging for each 3·25. At Rugby no change has taken place. Salisbury, with a decreased death-rate of 20 per cent., has an increase of 300 per cent. of deaths from scarlatina. Ely, with a saving of 14·50 in general deaths, loses 220 per cent. more from scarlatina. Leicester has 4·50 fewer deaths from general causes, yet increases the scarlatina death-rate by 180 per cent. Cardiff saves 32 per cent. in its general mortality, but has an increase of 90 per cent. from scarlatina. Bristol and Clifton have fewer deaths, but those from scarlatina are increased by 43 per cent. Worthing, also, increases its scarlatina death-rate by 105 per cent., with a small saving of the general death-rate. Chelmsford, where the general mortality increased, notwithstanding

sanitary improvements, to the amount of 9·50 per cent., shows an increase of deaths from scarlatina of 280 per cent.

If we look to the towns where a diminution of the scarlatina death-rate has occurred, we find that in many of them the lessening took place after a great increase that had arisen while the works were in progress. At Penrith, for eight years before any works were undertaken the deaths from scarlatina averaged 3·33; during the three years that the works were in progress they rose to 28·33; for the nine years following the completion of the works they fell to 1·83. At Morpeth, the scarlatina mortality rose from 13 to 19 during the works, falling to 7 after their completion. But a large increase during the progress of the works is not always followed by a remission on their completion. At Salisbury, before any works were commenced, the scarlatina mortality was 2·25; it rose to 12·33 during the works, and remained at 9 after their completion. Carlisle shows the largest mortality from scarlatina: before the works it was 15·50; while the works were in progress it rose to 18·75; after they were completed it fell to 11·75. In a note it is observed that "scarlatina came at Carlisle, previous to 1854, in two tremendous epidemics lasting about two years each, and after each epidemic there was a year without a single scarlatina death; while since 1857 it has never been wholly absent, but has never in one year caused a mortality approaching that of the former period." This fact is of importance in the present inquiry. At Ashby-de-la-Zouch, the most remarkable change has taken place in the prevalence of scarlatina as a mortal disease. Before any sanitary improvements were made the mortality from it was 0·75; during the works it rose to 10·50; and for ten years after their completion it averaged 8·33. The works effected at Ashby were as follows:—"Drying of subsoil, thorough sewerage by pipes, partial substitution of waterclosets for middens. New ample supply of water in lieu of bad water from surface wells; but a few wells still used. Better paving and cleansing. No overcrowding at any time." Population in 1861, 3840.

The latest date to which the Report reaches is 1865. It will be interesting to watch the prevalence of scarlatina at subsequent periods. According to the analogy of the disease, it is probable that those places which were worst up to 1865 may be more free during the succeeding decade.

Turning from the Ninth to the Eleventh Report of the Medical Officer of the Privy Council, we meet there with a carefully prepared paper by Dr. Ballard, on the health of the parish of Islington for twelve years, from 1857 to 1868 inclusive. This period takes in no less than four severe visitations of scarlatina —viz., in 1859, 1863, 1867, and 1868. His observations lead to

the following inferences:—1. A mean atmospheric temperature of about 60°, or between 56° and 60°, is that most favourable to the outbreak of scarlatina. 2. That for its free development it is necessary that the humidity of the atmosphere shall not much exceed 86, or be much less than 74. 3. That a higher temperature than 60° does not seem to be in itself unfavourable to the spread of the disease. 4. That a fall of mean temperature below 53° tends to arrest an epidemic of scarlatina. *At all seasons* of the year, but more especially in the winter and spring, its extension is favoured by a temperature above the average of the season. At all seasons, *except the autumn*, a dry as well as warm atmosphere is calculated to promote its epidemic prevalence; in *autumn*, the wetter and warmer seasons were those which proved most favourable to the extension of the disease.

In connexion with the question of atmospheric influences it is a curious fact that scarlatina is almost unknown in the Scilly Isles, with a population of over 2000. These islands also enjoy a remarkable immunity from small-pox, measles, and diphtheria.

Scarlatina, baffling as it does the ordinary sanitary measures, deserves all the more consideration in the subject of its treatment. It is undoubtedly true that some forms of the disease mock the best-devised methods of treatment, but these cases are happily rare. As the malady generally presents itself, few diseases yield to treatment more satisfactorily. The chief point is, not to be overmuch afraid of your enemy, and to put a *quasi* faith in the issue of the battle being on the side of recovery. Medicines easily become poisons in this disease; a smart purge or a repeated emetic not unfrequently changes a moderate and regular attack into one of peril, increasing the danger of all the symptoms. Next to a good supply of air and a comfortable bed, *quietness* is of the utmost consequence; a fussy nurse or over-anxious parents turn the scale against a patient with unerring certainty. Everything about a sufferer from scarlatina should be as quiet and as cheerful as it is possible to make it. An emetic of sulphate of zinc and ipecacuanha wine, in the *earliest* stage of the disease, is of use, helping as it generally does reaction; but it should not be repeated with a view of cutting short a disease which *will* run its course. If the patient can be kept alive for from seven to nine days, he will most probably make a good recovery. After the emetic, the patient should be allowed to sleep as much as possible; the more he sleeps on the first two or three days of the attack the better in all probability will be the result. At the end of that time, in most cases, all sense of depression or oppression will have passed away, and, quietness being maintained, an uninterrupted recovery ensues. Two remedies have proved almost equally useful: chlorine gas in a sweetened solution is most grateful to

the patient, and evidently helps him in his battle; but a better medicine is the liquor of acetate of ammonia, with a considerable excess of carbonate of ammonia, with ten minims of spirit of nitric ether in each dose. It should be given in doses repeated with greater frequency in severe cases. Gargles are useful in cooling and relieving the throat: a weak solution of chlorine gas sweetened, or of Condy's fluid, answers well as a gargle. It is a good practice to make a patient gargle before taking food or medicine. Nitrate of silver or strong hydrochloric acid must be used if there is much blocking up of the fauces, or grey patches on their surface. Ice is of immense use where there is either great throat affection or sickness. The pleasantest drink is soda water given freely, with wine added where wine is required.

The disease seems to produce a stretching or distension of every soft fibre and structure of the body. All treatment should be directed to the restoration of tone to the distended and weakened structures; with this view iron and quinine may be given early in the attack. From the fifth or sixth day six grains of the sulphate of iron, magnesia, and quinine* should be given *with* the ammonia draught. This mixture may be continued till convalescence is complete. Towards the end, in many cases, the sulphate of iron, magnesia, and quinine may be given alone in from fifteen to twenty grain doses. In this form iron and quinine rarely disagree with a patient, and aperients are seldom required during its use. The external treatment is of great importance; rapid sponging with vinegar and water is called for if the patient does not sleep, or if there is much irritation of the skin. In cases with extreme development of the rash and burning skin, the cold douche, rapidly given, acts like a charm. The patient, placed in a sponging-bath close to the bed, has four to five washhand basins of cold water poured in quick succession over him, is quickly rubbed dry, and put to bed, when, if the treatment has done good, he drops off to sleep almost at once. Warm baths early in ordinary cases do harm, nor should they be used until a certain amount of restoration of tone has taken place. Anointing with fatty substances early in the disease is not likely to benefit the patient; it may arrest to a certain extent the diffusion of the separated cuticle. Scrubbing a patient with carbolic soap in a bath ought to be postponed till a very late period of the disease. Before the restorative stage is reached, every exertion on the part of the patient should be avoided. Close stools near to the

* The magnes. ferri et quinæ sulph., as sold, contains, in twenty grains, one grain of sulphate of quina, three grains of sulphate of iron, and sixteen grains of sulphate of magnesia. In the form of powder it keeps well for a longtime, with out oxidation of the iron.

bed should be provided, and kept always charged with a disinfectant. If a warm bath is given, it should be brought close to the bed, and the patient ought not for any purpose to leave his bedroom till he has recovered his strength and appetite.

In none of the cases treated on the plan indicated has there been a disposition to the formidable sequelæ of scarlatina. In many of the cases albumen appeared in small quantity from the fourth to the sixth day, uniformly disappearing in from three to four days. Albuminuria was more frequent in the cases treated with chlorine gas, which was on that account finally abandoned for the ammonia and tonic treatment.

A well-regulated and sufficient diet, with a change of air, as soon as a removal is prudent, completes the recovery. Occupation, especially mental occupation, must be cautiously resumed. The brain, as much as any other organ, suffers from the stretching process of scarlatina. Early in the disease, books, conversation, light, and loud noises, should be avoided. Long after recovery the brain frequently shows signs of slow restoration of power.—*Lancet, Nov.* 20, 1869, *p.* 702.

6.—ON A CASE OF MALIGNANT SCARLET FEVER.—DEATH IN FORTY HOURS.

By J. J. THOMPSON, Esq., Surgeon 2nd Batt. 9th Regiment.

[The following case occurred in the garrison at Warley Barracks, Essex.]

The case which has come under my observation is remarkable, as showing how rapidly fatal the malignant form of scarlet fever may prove in a young and otherwise healthy man. Such was the intensity of the blood-poison in this instance that the man seemed suddenly struck down by it, and the case was evidently hopeless from the first. As has been so often noticed by other observers, the urgency of the local throat affection was by no means proportionate to the virulence of the constitutional phenomena.

On Thursday evening, Feb. 10th, 1870, at six o'clock, a young recruit from the depôt brigade of Foot Guards, in garrison at Warley, reported himself sick, and was at once admitted to hospital. He had been quartered at Warley since December last, and had the appearance as well as the character of being a strong and healthy man. He attended his usual drill the same afternoon (Thursday), and it was merely remarked by the drill corporal that he was not as smart as usual. There is no history of contagion, and the period of incubation must be conjectural.

On admission, he complained of his throat being very sore

and of a general feeling of illness. When seen directly afterwards, he was lying on his back, low in the bed; his face was congested; eyes suffused; pulse small and frequent; and his tongue was covered with a dirty, creamy coat.

Next morning (Friday) the constitutional symptoms were of a marked asthenic character; pulse 120, feeble and quick; tongue dry and brown in centre; face of a dusky leaden hue, and the abdomen and chest were covered with a dusky red efflorescence; the fauces, uvula, and tonsils were livid and swollen. Towards the evening he became worse, and during the night delirium, not of a violent character, was incessant, and he died at ten o'clock on Saturday morning, about forty hours from the time of his admission.

Wine and beef-tea were freely given from the first, as well as chlorate of potash and diffusible stimulants.—*Lancet, April* 2, 1870, *p.* 478.

7.—REMARKS ON THE NATURAL HISTORY OF RHEUMATIC FEVER.

By Dr. WILLIAM W. GULL, D.C.L., F.R.S., and Dr. HENRY G. SUTTON.

[The following report is founded upon twenty-five cases of rheumatic fever, all of which have been carefully watched by the authors.]

The acute symptoms terminated in these cases respectively on the 11th, 11th, 12th, 4th, 8th, 6th, 15th, 20th, 5th, 12th, 7th, 21st, and 3rd day. The average duration of the acute symptoms, therefore, in the thirteen cases was ten days.

In the first series of cases, under the care of Dr. Gull, treated for the most part with mint-water only, which we have published in vol. xi, of Guy's Hospital Reports, 1865, the average duration of the acute symptoms was 8·5 days.

In the second series, published in vol. xii, Guy's Hospital Reports, 1866, the average duration of the acute symptoms was 9 days.

And in this our third series of cases, as we have stated above, the average duration was 10 days.

There is, therefore, a difference of one day and a half only betwixt the three series of cases, the average of these three being 9·1 days.

This, we believe, will usually be found to be about the length of time that the acute symptoms generally extend over in cases of rheumatic fever, where there is no severe heart disease.

In the third series of cases, as we have just stated, the average duration of the acute symptoms was calculated at 10 days,

whereas in our first series of cases it was 8·5 days. This difference may be explained when we state that much greater care was taken in estimating the duration of the acute symptoms in the third series of cases than in the first. In the third series the temperature was taken every morning and evening, and until this was found to be normal the acute symptoms were not considered to have ceased. It not unfrequently happened that the tongue was clean and the patient was free from pain, but the temperature was higher than normal; in such cases, guided by the thermometer, we have concluded that the acute symptoms had not terminated. Whereas in the first and second series of cases, where the thermometer was not used, when the tongue was clean, the skin felt cool, and the patient was free from pain, the acute symptoms were regarded as having ceased. Had the temperature been taken in the first and second class of cases, we believe the average duration of the acute symptoms would have been about 10 days instead of 8·5 days.

The total duration of the acute symptoms, including the time that the patient was ill before coming into the hospital, was respectively 19, 15, 18, 9, 9, 14, 28, 31, 22, 10, 24, and 25 days, and the total duration of the acute symptoms—that is, from their commencement to their cessation—was, on an average, 19 days.

We now proceed to ask—Is the duration of rheumatic fever longer when it is treated on the expectant plan, or when it is treated by drugs? We very much regret that, owing to the arrangement of Dr. Dickinson's paper (Med.-Chir. Transactions, vol. xlv, on "The Treatment of Rheumatic Fever,") we could not compare his cases with our own. In Dr. Garrod's cases (Med.-Chir. Transactions, vol. xxxviii), treated by large doses of alkali, the male patients were, on an average, in the hospital 6·2 days before the acute symptoms subsided, and females were 7·3 days before the acute symptoms subsided. The average of the two was 6·75 days.

In Dr. Herbert Davies' cases (London Hospital Reports, vol. i), treated by blisters, the duration of the acute symptoms, while the patients were in the hospital, was, on an average, 8·4 days.

When, however, we take the thermometer as a guide, we find in Dr. Herbert Davies' cases that, although the patients were free from pain, and the joint symptoms had also subsided, on an average, in 8·4 days, yet the temperature of the body was not normal until, on an average, 9·5 days.

In Dr. G. Owen Rees' cases (Guy's Hospital Reports, vol. xii, 1866), treated by lemon-juice, the duration of the acute symptoms in the hospital was 6·8 days.

And under the expectant treatment the duration of the acute symptoms in the hospital was 9·1 days.

To give this evidence more briefly, under the full alkaline treatment the average duration was..... 6·75 days.

Lemon-juice ditto..... 6·8 ,,
Blister treatment ditto.... 8·4 ,,
Expectant treatment ditto 9·1 ,,

There was, therefore, a difference of a little more than 2 days in favour of the full alkaline and lemon-juice treatment, and the average in the blister and expectant treatment was almost equal.

When, however, the duration of the acute symptoms was tested still more accurately by the aid of the thermometer, we find that under the blister treatment it was, on an average, 9·5, under the expectant treatment 10 days.

The total duration of the acute symptoms, including the time the patients were ill before and after going into the hospital, was—

Under the full alkaline treatment ..... 13·5 days.
Under the blister treatment (not estimating by aid of the thermometer) was ..... 15·7 ,,
When the acute symptoms were estimated by the thermometer the duration was (under the blister treatment) ..... 17·27 ,,
Under the expectant treatment ..... 19·0 ,,

These differences are very slight, so much so that they appear to us to argue that one plan of treatment (as regards shortening the duration of the rheumatic process) has no great advantage over the other. Probably it will be admitted that no great importance should be attached to the fact that under one plan of treatment the duration of the acute symptoms was a day or two less, for every physician is well aware how difficult it is to fix the period when the acute symptoms have just ceased, so as not to be a day before or after the time when they have really subsided; for patients differ very much in estimating their own pain, and we therefore have to deal with all the uncertainty of subjective symptoms. It can, perhaps, be readily understood that one practitioner might consider a patient had lost all his acute symptoms to-day, whilst another practitioner, guided by the fact that the tongue was almost though not quite clean, that the patient was practically although not absolutely free from pain in the joints, might consider that the acute symptoms had not quite subsided, and then allow another day or two to pass over before he decided that the acute symptoms had ceased. Bearing this in mind, it appears to us that we cannot attach much importance to this difference of one or two days.

We therefore submit that there is no evidence to show conclusively that alkalies, lemon-juice, or blisters, curtail the duration of the rheumatic process. And we agree with Dr. Barclay, when (on Gout and Rheumatism, p. 32), speaking of the administration of alkali in rheumatic fever, he states, "We are not yet in a position to say that it exercises any influence in curtailing the duration of the disease."

With respect to lemon-juice also, we are not satisfied that it has any such power.

We have witnessed the trial of Dr. Herbert Davies' blister treatment in a few cases which have occurred in Guy's Hospital, under the care of Dr. Wilks and the late Dr. Barlow, also in cases which have occurred in the London Hospital, and it has appeared to us to relieve very much the pain and sufferings of the patient in some cases, but it has not appeared to curtail the rheumatic process. We noticed that, although the temperature of the body fell during the application of the blisters, yet it did not immediately return to its normal standard. It remained higher than normal for some days after the pain had abated, nor in several cases did the tongue become clean, the appetite return, nor the urine fall in specific gravity, as usually happens when the rheumatic process is really over. Moreover, Dr. Davies' cases do not show, when compared with those here recorded, any decided evidence in favour of the blister treatment beyond the fact that the blisters appear to have given much and speedy relief to the pain in the joints. We therefore regard the application of blisters as a valuable agent in relieving the sufferings of the patient, but we are unable to say that it curtails the duration of the rheumatic process.

Our cases appear to us to teach that the rheumatic process runs its course under the expectant plan as favourably as under the treatment by drugs.

While it has been admitted by those who advocate the treatment of rheumatic fever by alkalies, that large doses of such drugs do not curtail the duration of the disease, nor bring very great relief to the patient, yet it is stated, to quote the words of Dr. Barclay, "that it does most incontestably prevent inflammation of the heart," and he further states "that the proportion of heart ailments is very much reduced by the employment of the alkaline treatment."

We now propose to inquire what evidence there is to support this statement?

We may now pass on to show what was the state of the heart in those cases where there was well-marked disease of that organ. In thirteen of these twenty-five cases there were physical signs indicating organic disease of the heart, particulars of which may be briefly given as follows:—It may be noticed

that in every one of these cases the heart was more or less organically diseased when the patient was admitted into the hospital. In five of these thirteen cases there were physical signs of pericarditis on admission, and in three of the five there was a mitral bruit when the patients were discharged from the hospital. In a fourth a systolic aortic bruit was heard, and in the fifth case the heart was healthy when the patient was discharged. In one patient the first sound was prolonged at the base on admission, subsequently pericarditis and pneumonia supervened, and the heart was healthy when the patient was discharged from the hospital. In three patients there was a mitral murmur on admission and when discharged from the hospital. In one there was an aortic obstructive bruit on admission and when discharged. In one the cardiac dulness was normal; the first sound was prolonged at the base on admission, and a mitral bruit existed when the patient was discharged. In one case there was a systolic bruit at the base on admission, and at the apex when discharged. In one case the apex beat was unduly marked, and there was præcordial pain on the day after admission; a new-leather-creaking bruit subsequently developed itself, and the patient died. Besides these cases, in which there was well-marked organic disease of the heart, there were twelve others in which there was no evidence of organic disease of the heart, but there was in nearly all more or less evidence of functional disturbance of this organ, or of changes in the blood producing so-called anæmic bruits. And in one or two cases the physical signs were such as might be said to indicate slight disease in the pericardium. These indications were, however, so slightly marked that it would be a matter of dispute as to whether they did or did not indicate morbid changes in the tissues of the heart. Not one of these patients had disease of the heart when discharged from the hospital.

The particulars of the twelve cases may be briefly summed up as follows:—In one case there was no bruit, but the heart's action was unduly marked. In one case there was a systolic, apparently an anæmic, bruit at the base on admission and when discharged. In one case the first sound was prolonged on the day of admission; on the seventh day a bruit was heard over the base, which afterwards entirely disappeared. In one the apex beat was unduly marked on admission, and on the third day a bruit was heard, and the heart was healthy when discharged. In three cases the cardiac dulness was somewhat increased, and a systolic bruit was heard over the base when admitted, but it was indistinct when the patient was discharged in one of the three cases, and there was a systolic bruit at the base on admission, and the heart was healthy when dis-

charged, in two of the three cases. In one case there was a systolic bruit at the base on admission, and the cardiac dulness was somewhat increased on the third day, and the heart was healthy when the patient was discharged. In one case a bruit was heard at the apex of the heart, which afterwards disappeared. In one a new-leather-creaking sound was heard, and the heart was healthy when discharged. In one the first sound was prolonged and the dulness increased on admission; afterwards a bruit was heard, and the heart was healthy when the patient was discharged. In one there was a bruit at the base on admission, and the first sound was prolonged when the patient was discharged from the hospital.

These details concerning the heart show that when rheumatic inflammation attacks the heart, and is allowed to run its natural course, the pericardium may become very extensively diseased, and yet the valves of the heart may escape, but in other cases in which there is pericarditis the valves may become diseased and rendered incompetent. Nor does it follow, because the pericarditis is severe and extensive, that the valves of the heart will certainly become diseased, but in the majority of cases in which there was severe pericarditis the valves did become involved.

Again, the cardiac dulness may be somewhat increased and extend higher than normal, and the first sound may be prolonged at the base. This prolonged first sound may develop into a bruit, and be followed by well-marked mitral disease. In other cases there may be a similar increase of cardiac dulness, and a new-leather-creaking sound may be heard at the base of the heart, and this may subside and the heart remain healthy. Further, a prolonged first sound may be heard over the base of the heart, and this may develop into a systolic bruit and afterwards entirely disappear, leaving the heart healthy. A slight bruit may be heard over the apex of the heart, and afterwards it may completely disappear and the heart remain healthy.

It is instructive to notice that there was more or less modification of the heart sounds during some period of the attack in every case except in one. In only one case did the heart sounds remain perfectly healthy throughout the entire disease. But in eleven cases the abnormal sounds were such as are not usually considered to indicate any organic affection of that organ, and these abnormal sounds subsequently totally disappeared, and there was no evidence of cardiac disease when the patients were discharged from the hospital.

We now proceed to ask the question—If the heart was healthy when the patients were admitted into the hospital, was it common for it to become diseased while the patients were under treatment by mint-water in the hospital?

Our cases show that when patients free from heart affection were admitted into the hospital suffering from rheumatic fever, and the disease was allowed to run its natural course uninfluenced by drugs, it was a very rare thing for the heart to become diseased while the patients were under treatment in the hospital.

Ordinarily patients suffering from rheumatic fever do not enter the hospital until the disease has been going on some days, usually about six or eight days, and in a great number of cases the heart has already become diseased before entering the hospital. If, however, the patients were in the hospital at the commencement of the disease, we should probably more frequently observe the heart become diseased while they were under treatment. One patient, therefore, that was in the hospital from the first to the last of the rheumatic fever ought not to be compared with the cases that have suffered from rheumatic fever for some days before coming under observation.

Our cases of rheumatic fever therefore show that of twenty-five patients suffering from a first attack of this disease, twelve had organic affection of the heart on admission into the hospital.

In one patient who was in the hospital from the commencement of the attack there was some, but very doubtful, evidence of heart disease on admission into the hospital, and pericarditis supervened while under treatment. In another patient there were no physical signs of heart disease on admission, but there was great distress and pain in the chest. Forty-eight hours after admission there were indications of pericarditis in this case. In eleven cases there was no organic disease of the heart on admission, and none supervened while the patients were under treatment.

Our cases further show that where there was no evidence of organic disease of the heart on admission into the hospital, the heart was free from all evidence of disease when the patients were discharged from the hospital. Not one of our patients came into the hospital without heart disease and left the hospital with evidence showing that the heart was diseased.

The experience gained in these cases of rheumatic fever which were allowed to run their natural course uninfluenced by drugs tends to prove that, if patients are admitted into the hospital suffering from a first attack of rheumatic fever, and the heart is not diseased on admission, it will very rarely become organically diseased while the patient is under treatment.

It is rare for the heart to become diseased when the disease is allowed to run its course uninfluenced by drugs, and, judging from the evidence before the profession, it is also rare for the heart to become diseased when rheumatic fever is treated by drugs.

In support of the latter statement we may be permitted to bring forward the following evidence:—Dr. Garrod, speaking of the alkali treatment in rheumatic fever (Med.-Chirurgical Transactions, vol. xxxviii, p. 151) says, "I cannot help thinking that an effect is likewise produced on the cardiac disease to a very considerable and important extent." In no case did the affection of the heart ensue after the patient had been more than forty-eight hours under the influence of medicine.

The statistics of Dr. Dickinson (Med.-Chir. Trans., vol. xlv, p. 350) show that in forty-eight patients subject to the full alkaline treatment only one had pericarditis commencing after treatment had begun.

Dr. Herbert Davies, speaking of the treatment of rheumatic fever by blisters (London Hospital Reports, vol. i, p. 300), says, "In no case where the heart was sound at the time of admission did any organic lesion subsequently develop itself."

Dr. G. O. Rees also has informed us that when cases of rheumatic fever were treated with lemon-juice it was exceedingly rare to find the heart become diseased during treatment, provided it was healthy when the patient was admitted into the hospital.

Dr. Basham, in his paper on "The Treatment of Rheumatic Fever by Nitrate of Potash" (Med.-Chir. Trans., vol. xxxi, p. 14) gives, in a tabular form, an account of seventy-nine cases of this disease. One of these cases was probably not rheumatic fever, making the number seventy-eight cases, all of which were treated by nitrate of potash.

In sixty-one cases there was no heart disease. In twelve cases there was no heart disease on admission, and in only five cases did the heart become diseased while under treatment.

The experience, therefore, of these several physicians in cases of rheumatic fever is, that it is rare for the heart to become affected while patients are under treatment in the hospital; that in nearly all the cases where there was heart disease it had commenced before the patient was admitted into the hospital.

It is difficult to understand how remedies so different in their nature and in their actions should all work in such a manner as to bring about the same result—how the administration of large doses of alkali should produce the same result as the application of blisters to the joints.

It may be said that the operation of alkalies, lemon-juice, and blisters, are different, but that they all accomplish the same end by either neutralising or eliminating the poison or the materies morbi of rheumatic fever. But can we reason in this way without begging the question? For it is not proved that there is a poison or materies morbi to be either eliminated or neutralised, and if we propose a theory to explain how these

different remedies destroy the theoretical materies morbi it appears to us that we are only making a theory to explain a theory.

Seeing, therefore, that the heart rarely became affected when the rheumatic fever was not treated by drugs, we are compelled to ask the question—What evidence is there to show that any of the different plans of treatment which are advocated have any decided power in preventing the heart becoming diseased?

It appears to us that there is not sufficient evidence to prove that any of the systems of treatment have power to prevent the heart becoming diseased; and in concluding that the treatment has prevented the heart becoming diseased, physicians have overlooked the fact that there might be no tendency at the time that the patients were under treatment for the heart to become diseased, and our cases show that the good results which have been attributed to the influence of the remedies also occurred when no special remedies were used.

Our cases, therefore, tend to teach that these good results were due, not to the drugs, but to the natural course of the disease.

Before we conclude that it was something connected with the natural course of the disease which prevented the heart becoming diseased while the patients were under treatment in the hospital, it is necessary to ask, was there not something common to all these different plans of cure which prevented the heart becoming diseased, and was this something not present in the blister, in the alkali, the acid, and in the expectant plan of treatment?

The only things, perhaps, which were common to all these modes of treatment were rest and regulated diet.

Then the question arises—Are rest and regulated diet sufficient to explain this immunity from heart disease? It appears to us that they are not sufficient. For patients suffering from a primary attack of rheumatic fever have had well-marked symptoms of that disease for some days before coming into the hospital, and the heart has been organically diseased on admission, yet these patients have rested and lain in bed some days and even weeks before entering the hospital. Again, other patients have not rested while they were suffering pain in their joints and had other symptoms of rheumatic fever, and yet on admission into the hospital with a primary attack of rheumatic fever the heart has been found to be free from disease.

It would appear, therefore, that rest and regulated diet are not alone sufficient to explain why the heart rarely becomes affected when the patients are under treatment in the hospital.

We shall now pass on to point out evidence which tends to show that when the heart becomes diseased in rheumatic fever

it does so at an early stage of the disease, and if the heart does not become diseased during the first week of the rheumatic fever it rarely does so afterwards.

In order to do this it is necessary to show, when patients labouring under a primary attack of rheumatic fever were admitted into the hospital with heart disease, that such disease had set in during the first week of the fever.

[Then brief particulars are given of cases, showing that it is in the early part of a case that the heart becomes affected.]

These eight patients were placed under the mint-water treatment; the rheumatic fever was, therefore, allowed to run its natural course.

All these patients were admitted into the hospital during the first week of the fever free from organic disease of the heart, and while they were under treatment during the second and subsequent weeks of the seizure no heart disease came on. In not one instance did the patient escape heart disease during the first week of the rheumatic fever and contract such disease during the second or later weeks of the fever.

If the heart were not diseased in the first week it did not become diseased in the second or in the later weeks of the rheumatic fever.

It will be instructive now to inquire if what we have stated respecting the heart becoming diseased in the first and not in the second week of rheumatic fever in anyway explains why the heart did not become diseased when patients were in the hospital and treated by alkalies, lemon-juice, blisters, or by the expectant plan.

The explanation would, according to what we have shown, appear to be that patients suffering from rheumatic fever are not, as a rule, admitted into the hospital until the period when the heart is liable to become diseased has passed over. Experience teaches that the heart becomes diseased at the very outset of the rheumatic fever, before the patients enter the hospital, and if the patients pass the first few days of the rheumatic fever without the heart becoming involved then they do not contract heart disease during the later part of the rheumatic attack.

Some patients treated by mint-water entered the hospital as early as the third, fourth, and fifth day of the rheumatic fever, without any heart disease, and the heart did not become diseased while the patients were under treatment.

Some patients treated by blisters or by alkalies, entered the hospital as early as the third, fourth, and fifth day, without any heart disease, and the heart did not become diseased while the patients were under treatment. The same thing occurred, therefore, when the disease was allowed to run its natural

course as occurred when the disease was treated by blisters or alkalies.

In our cases treated by mint-water the rheumatic fever commenced, on an average, eight days before the patients entered the hospital.

We may now briefly sum up the various conclusions arrived at in this paper as follows :—

1. That rheumatic fever uncomplicated with any very severe heart affection tends to run its course in nineteen days, calculating from the time the rheumatic symptoms first set in to their termination.

2. That the average duration of the acute symptoms while patients were in the hospital and free from very severe heart complications was nine days.

3. That in nearly all the cases referred to in this paper, there was some modification of the heart's sounds during some period of the rheumatic attack.

4. That severe pericarditis complicated with pneumonia may subside and leave the heart healthy, so far as we can test by our present means, without the aid of any drugs.

5. That when the heart was healthy on admission into the hospital, it was very rare for it to become organically diseased while the patients were under treatment by mint water, or, in other words, when the rheumatic fever was allowed to run its natural course.

6. That the evidence before the profession shows that the heart very rarely became diseased while the patients were under treatment (in the hospitals). And that this was the case when the patients were treated by alkalies, lemon juice, or by blisters to the joints.

7. That there is not sufficient evidence before the profession, to prove that any of the advocated remedies have power to prevent the heart becoming diseased.

8. That in concluding that the treatment has prevented the heart becoming diseased, we have overlooked the fact that there might be no tendency at the time the patients were under treatment for the heart to become diseased.

9. That in rheumatic fever the tendency is for the heart to become diseased during the first few days of the fever, and should it escape the early days of the disease, there is each day a lessening tendency to its implication; hence, our cases would appear to show that if at the end of the first week of the rheumatic fever the heart is free from disease, there is little or no tendency for it to become diseased during the later weeks, provided patients are treated by rest and regulated diet.

10. That the reason why the heart did not become diseased when rheumatic fever was treated by alkalies or blisters to the

joints is to be attributed not to the influence of the drugs but to the natural course of the disease. For the patients did not come under treatment, until the rheumatic fever had been going on some days, and until the period when the heart was most liable to become diseased had passed over.

We ought not to conclude the paper without expressing our conviction that hitherto the investigation into the therapeutics of the rheumatic process have been rendered all but valueless by the deficiency in preliminary data. There are as yet no reliable facts in the pathology of the process; we are ignorant of the essential state of which the rheumatic symptoms are an expression.

At present, therefore, as regards treatment, our cases seem to show that we are limited to a careful regimen of the patient. Rest, mechanical and physiological. Rest in the very outset of the disease. We ought not to wait until the rheumatic process has become well developed in the joints. For it appears to us that the heart becomes involved simultaneously with the joints, and by rest we hope to quiet the heart's action, and so prevent it becoming diseased.

To regulate the temperature. To moderate excessive skin function by sponging the surface of the body with tepid water. To allay pain by placing the patient in an easy position, and sometimes by opiates. To sustain the organic nerve power by light diet, and occasionally by small doses of alcohol. To procure rest by the simplest means, especially avoiding such movements of the body as may excite the circulation. In fine, to place the patient in a physiological state of mean rest, if it may be so expressed, of the nervous, the circulatory, the muscular, and the digestive systems.

To do this fully will tax often all our energies, and we should not be just to ourselves if we did not here say that to attain this has been the object of our greatest care. It required often more consideration than was requisite for prescribing any supposed appropriate drug treatment. We are therefore, at present, advocates of the exactest treatment of the patient under acute rheumatism, though we may doubt the value of so-called specific drugs.—*Medico-Chirurgical Transactions*, Vol. lii, *p.* 43.

8.—REMARKS ON THE TREATMENT OF ACUTE RHEUMATISM BY THE TINCTURE OF THE PERCHLORIDE OF IRON.

By Dr. J. Russell Reynolds, F.R.S., Physician to University College Hospital.

The marked effects produced by the tincture of the perchloride of iron on the course of such "spreading" inflammatory

affections as erysipelas and diphtheroid sore-throat induced me, some months ago, to administer this medicine to cases of another "spreading" inflammatory disease—viz., acute rheumatism. I have treated eight cases by this drug—cases all of them severe, and, with one exception, occurring during the unfavourable weather of the spring of this year. The number of cases is too small for a general conclusion to be drawn from them as to the treatment of rheumatic fever; but the character of the facts is such that they may be used to point out the direction in which such conclusion may eventually be found; while the success which attended this mode of treatment was so great as to justify its employment upon an extended scale.

I will enumerate, as briefly as possible, the essential points of each case.

Case 1.—Male, aged 26; first attack. He had been eight days ill with fever and joint-affection. He was seen on the eighth day, with inflamed joints of all four extremities, and endocarditis. Pulse 112. The urine was alkaline. His face was anæmic. Temperature 101·4 deg. He was ordered thirty minims of tincture of perchloride of iron every six hours. The patient improved at once; and on the tenth day of illness—*i.e.*, on the second day from the commencement of treatment—he felt well, slept soundly, and took food. On the thirteenth day, the patient still feeling well, the temperature rose to 102 deg., and, a few hours later, to 104 deg. Violent delirium set in suddenly on the fifteenth day. The temperature rose to 109 deg. The patient became comatose, and died on the sixteenth day; the temperature having reached 110·2 deg. shortly before death.

Case 2.—Male, aged 22; second attack. He was seen on the fourth day of illness. The knees and ankles were principally affected. He had much sweating and exhaustion, and endo-pericarditis. The urine was alkaline, with some discharge left from gonorrhœa of two months' duration. Pulse 100; temperature 102·2 deg. The medicine was ordered on the fourth day of illness. The pain was relieved on the next day, and was absent on the third day. The temperature was normal on the fifth day of treatment—*i.e.*, the ninth day since the attack. While this patient was taking iron, the pulse became as low on one day as 60 per minute.

Case 3.—Male, aged 20; third attack. He was seen on the sixth day of illness—*i.e.*, on the sixth day from the occurrence of the joint-affection, and the fourth day from the onset of fever. The joints were universally affected, and severely. A murmur was present both at the base of the heart and at the mitral apex—probably old. Pulse 96; temperature 102 deg. The tincture of perchloride of iron was given in forty minims doses; it was ordered on the sixth day of illness. The patient

was much relieved, and the pain was almost gone, next day. The temperature was normal on the second day of treatment, or eighth day of disease. The temperature was below the normal on the thirteenth and fourteenth days.

Case 4.—Female, aged 18; second attack. She was seen first on the seventh day of illness, suffering in the joints of both upper and lower extremities, with much perspiration. Pulse 104; temperature 101·4 deg. The heart was dilated with aortic regurgitation. The pain was greatly relieved on the fifth day of treatment. The temperature became normal on the seventh day of treatment—*i.e.*, on the fourteenth day from the onset of symptoms.

Case 5.—Female, aged 18; first attack. She was admitted on the third day of illness, with typhoid aspect, much prostration, and pain and swelling of the joints, confined to the lower extremities. There was a systolic murmur at the base of the heart, probably hæmic. Pulse 120; temperature 104 deg. Tincture of perchloride of iron, in forty minim doses every six hours, was ordered on the third day of illness. The pain was relieved, and the patient much improved on the fifth day of illness—*i.e.*, two days after the treatment was commenced. The temperature was normal on the fourth day of treatment, the seventh from the commencement of symptoms. In this case, after the iron had been discontinued, the pulse became irregular, weak, as low as 56 in the minute, and occasionally intermittent for two days. There was at the same time much pallor; but the patient made a good recovery.

Case 6.—Female, aged 30, seen on the eleventh day of her first attack. There had been illness, with cough and fever, for eleven days; inflammation of the joints for eight days; and sweating for one day, before admission. Both upper and lower extremities were involved. The heart was weak and irregular in its action, and there was no friction-sound at the base. Pulse 124; temperature 102·4 deg. Tincture of iron was prescribed on the eighth day of the joint-affection; and the pain disappeared almost entirely within twenty-four hours. The temperature fell at once, and became normal on the fifth day of treatment, or the thirteenth day from the occurrence of articular inflammation.

Case 7.—Female, aged 24; first attack, commencing seven days before admission. On admission, the patient was pale and sweating, with much effusion in the joints of the lower extremities, and mitral regurgitation. Pulse 120; temperature 103·4 deg. The pain was diminished immediately, and almost removed at the end of the next day. The temperature became gradually reduced, and was normal on the seventh day of treatment; and remained so until the eleventh day, when the iron was discon-

tinued. On the eighteenth day there was a relapse, and the temperature rose again, until, on the twenty-third day, it reached 104 deg. Iron was administered on the second day of relapse, and relief followed on the third day of its administration; while the temperature became normal on the seventh day of treatment, or eighth day of relapse.

Case 8.—Female, aged 16, seen on the ninth day of her first attack. The joints of both upper and lower extremities were involved. There was pericarditis, with effusion. Pulse 100; temperature 102·4 deg. The pain was relieved almost immediately; and the joint-affection disappeared in the course of forty-eight hours; but pneumonia occurred, and for many days the temperature remained high—finally, however, becoming normal on the twenty-seventh day, and the patient making a good recovery.

The points to which I wish to direct attention are the following.

1. *The relief of the joint-affection.*—This appears to me to have been so definite, uniform, and speedy, that it would be difficult to account for it upon any other supposition than that it was the result of the treatment. In four cases, it was relieved in one day; in three cases, it ceased in two days; in one case—viz., that of the relapse mentioned in No. 7—it was removed in three days; and the longest period of suffering noted after the commencement of treatment was five days. If we take the mean duration of the joint-affection after the exhibition of the iron, we find it to be two days.

2. *The duration of pyrexia after the administration of iron.*—In one case—viz., that which ended fatally with cerebral symptoms—the temperature never fell below 101·4 deg; and it is important to observe this fact, notwithstanding the disappearance of the articular affection. In one case, the temperature was normal on the second day; in one, on the fourth; in two cases, on the fifth; in three, on the seventh, one of these being an example of relapse; in one, on the eighteenth day, this being in the girl who suffered from pneumonia. If we exclude from analysis the first case—viz., that with cerebral symptoms and a high temperature; and also the last—that in which pneumonia was intercurrent—we find that the temperature became normal between the second and the seventh days; the mean duration of pyrexia after the iron treatment was commenced being a little less than five days and a half.

3. *The total duration of pyrexia*; viz., that which existed from the onset of symptoms to the permanent fall of temperature. Here, again, it is necessary to exclude the first case and the last; for in the one the pyrexia never ceased, and in the other it was maintained by an intercurrent affection. In one patient, the

total duration of rheumatic fever was seven days; in two, it was eight; in one, it was nine; in one, thirteen; in one, fourteen; in another, fifteen. Hence it would appear that the mean duration of rheumatic fever in these seven cases was a little in excess of ten and a half days.

4. *The influence on the duration of the disease exerted by the time at which the treatment was commenced.*—In three cases, the iron was given on or before the fourth day of the disease, and the mean duration of the malady from first to last was eight days; in four cases, the medicine was administered for the first time on the sixth, seventh, and eighth days; and in three the mean of the total duration was rather above twelve days.

5. *The entire absence of any symptom of discomfort induced by the iron.*—There was no headache in any case; the tongue cleaned; and the general feelings of the patient speedily improved. As I have already said, the number of cases here examined is too small to allow of any general deduction with regard to so variable a malady as rheumatic fever; but, while the number of cases is small, the facts are, in my opinion, so definite, and so constant in the direction to which they point, that I trust they will lead others to employ, and on a large scale, a medicine which has certainly done no harm, and has appeared to relieve very materially the pain, and shorten the duration of one of the most distressing and most tedious of acute diseases.—*British Medical Journal, Dec.* 18, 1869, *p.* 649.

9.—CHRONIC RHEUMATISM AND ITS COUNTERFEITS.

By Dr. J. MILNER FOTHERGILL, Senior Resident Medical Officer, Leeds Dispensary.

The name rheumatism—or, as it is now more precisely termed, chronic rheumatism—has been used as a generic term for persistent pains, unaccompanied by constitutional disturbance, irrespective of their causation, and has covered an unknown amount of carelessness and ignorance; while, as a verbal placebo, it has often been used to justify a do-nothing treatment, sometimes very reprehensible. This is less true, however, of the present time than of the past; and now an apyrexial condition, accompanied by varying amount of pain, is found to be the result of many other causes as well as the poison of rheumatism. It may be well to state at once what that poison is, assuming that rheumatism, or what we call rheumatism, is dependent on an altered condition of the blood: in fact, is the external expression of a material in the blood, either morbid, or normal in excess. Lactic acid is this material in the belief of most observers, but not of all. One thing, however, seems

universally admitted, namely, that it is an acid. Lactic acid is a product of assimilation, and is the normal result of the digestion of amylaceous or saccharine compounds, each molecule of grape-sugar ($C_{12} H_{12} O_{12}$), being broken up into two molecules of lactic acid ($2 C_6 H_6 O_6$); and it has been further stated that the oxidation of lactic acid is the true form of hydrocarbonaceous combustion. This goes on through the agency of the soda in the blood, and is imitated in the reduction of a salt of soda and a vegetable acid, of whatever kind, to a carbonate, in which form it is eliminated by the kidney. "A combustion of an acetate or tartrate, consuming oxygen and producing carbonic acid, is, in all probability, strictly analogous to a natural burning of lactate of soda, always going on in the blood for the maintenance of the animal heat." This theory is ingenious, but will require further corroboration before it is universally accepted: it seems very probable at any rate. This, however, is certain, that lactic acid is a normal product of the body, and that rheumatism is usually supposed to be the result of its presence in excess. Lactic acid is found in sweat, and the natural emunctory of its excess is the skin. Excess of lactic acid in the blood may arise in two ways—one from excess of saccharine matter undergoing fermentative change, and overrunning the powers of excretion—or from normal production with defective elimination. Both forms are commonly seen; the first, however, more in connexion with acute, the latter with chronic, rheumatism. This *materies morbi* seems to have an affinity for the fibro-serous textures, and thus, in addition to its partiality for the joints, fixes on the fibro-serous textures of the heart; and from the changes thus produced by its action, do we have the great majority of our diseased and altered valves. It is not, however, confined to the fibro-serous textures, and may be muscular, neuralgic, periosteal, or sclerotic. Rheumatism, in its causation, has some curious relationships. It has a singular and most inexplicable connexion with the urethra. Acton says, "It would almost appear that rheumatism enters the system by the urethra. Rheumatism is produced by the passage of sounds and lithotriptic instruments as well as by the application of foreign matters. Urethral inflammation only is requisite to excite rheumatism in those who are hereditarily disposed to it. In gonorrhœal rheumatism, arrest of the discharge is often the readiest cure for it, though at other times it seems to follow the arrest of the discharge." Of this curious connexion no explanation as yet has been given. Another curious connexion exists between rheumatism and atmospheric changes: the joints of the rheumatic are often as certain indications of coming changes in the weather as barometer or aneroid. Some, in fact, only suffer from pain at

these periods of change. Rheumatism is an ailment connected with families, and a predisposition may be handed down for generations. Rheumatism is often a troublesome inheritance, and, in those so hereditarily predisposed, slight causes are sufficient to excite a very persistent attack. It is commonly strong and otherwise healthy families with which rheumatism is connected. Mitchell, of Philadelphia, and after him Day in England, has advanced the idea that acute rheumatism is, in its origin, cerebro-spinal, and allied to cerebro-spinal meningitis; this view seems untenable, as the one is rarely fatal, the other is commonly so. Rheumatism seems rather to be associated with the organic than the cerebro-spinal nervous system.

The symptoms of chronic rheumatism are such as might be expected from a blood-poison, and its manifestations are various. "The affection may show itself in the joints, giving rise to stiffness, a dull aching, and pain produced by motion, but without heat, obvious swelling, tenderness, febrile excitement or marked sweating; or it may implicate the muscles in various parts of the body, occasioning stiffness as well as pain when moved; or it attacks both joints and muscles, or is seated chiefly in the sheaths of the nerves, leading to what is called neuralgic rheumatism; of which, for instance, sciatica often affords a striking instance."—(Da Costa.) One property it has of making rapid metastases, of suddenly quitting one part to manifest itself in another; on other occasions it lingers round one part with great pertinacity. Whatever form it assumes, so far as my experience goes, rheumatism is always accompanied by the presence of an acid, both in the secretions and excretions; and of this condition the readiest evidence is furnished by the saliva. More readily accessible, and of not normally so decidedly acid reaction as the urine, I have been led to prefer it for testing purposes. Its normal reaction is faintly acid, but frequently it is neutral, and is always so during the alkaline tide of digestion of Roberts. If the saliva gives an acid reaction, as shown by the reddening of litmus-paper, at all decided, especially during digestion, the presence of an acid in excess may be at once inferred. As to whether that acid is lactic or uric, it cannot furnish evidence. When the reaction is not acid, the complaint is essentially neuralgic and not rheumatic, and a clue is at once furnished to the more exact treatment. Where there is decided acidity, relief is always afforded by alkalies. Pain is often the prayer of a nerve for healthy blood (Romberg); and, when so occasioned, is most readily and certainly treated by removal of that cause, where practicable. An acid condition of the system is often seen in growing children, and is often termed rheumatism; this is the "growing

fever" of Lugol. In some children, and indeed adults, who suffer from a deficient power of cell-formation—*i.e.*, the strumous—the presence of an acid is usual; it is, however, generally uric acid, and is shown by calculus, gravel, nephria, acid sweats and secretions, injured teeth from the constant presence of an acid acting on the carbonate of lime, sour breath, &c.; and this explains the efficacy of potash in these conditions. Potash acts as a veritable hæmatic and blood restorative, by aiding in the elimination of the uric acid, and thus producing a more healthy blood. "Thus the uric acid which constitutes the urinary excretion of birds, whose habits are active and temperature high, and whose blood is highly oxygenated, cannot arise from insufficient supply of oxygen, but must depend on some peculiarity in the tissues; so also in man, uric acid may be the effect of defective nutrition or primary assimilation, and not merely of imperfect metamorphosis or oxidation. The clinical history of the so-called uric acid diathesis supports this view, and shows that the remedy, in many cases, must be sought, not in the promotion of oxidation, but in modification of the nutritive processes."—(Broadbent.) In this condition, potash, by relieving the blood of its *materies morbi*, and thus improving its quality, allows of a more perfect tissue-nutrition in which the blood-glands share, and are thus enabled to perform a more perfect chylous elaboration. Potash is found in the muscles, soda in the blood; potash is more associated with tissue-metamorphosis, soda with respiratory change. Potash is the remedy in excess of uric acid, soda is just as useful with lactic acid. Urate of soda (chalkstones) is insoluble; urate of potash is a readily soluble salt. Pain, general or local, is the usual accompaniment of deficient or defective blood. Whenever the blood is altered from its normal condition we have pain; thus in syphilis, ague, lithiasis, rheumatism, anæmia, &c., we have local manifestations of a general condition. Why, however, a blood-poison should manifest itself in a nerve or group of nerves, as is the case in rheumatic and other neuralgiæ—why the general condition should make itself apparent in one locality, or inversely—how it happens that one portion of the organism alone affords manifestations of a general systemic blood-poison,—is explicable enough in the case of injury or excessive action; but it is not confined to these localities, and may show itself in a manner as yet inexplicable. This is deserving of attention, and, if explained, may afford a clue to a deeper insight into the *modus operandi* of morbid action in its early stages than as yet exists. We know, from experience, that the pain resulting from these causes—the external or outward visible sign—is relieved by mercury, iodide of potassium, quinine, potash, iron, arsenic, &c., according to the cause; and

that in these conditions these drugs are, one and all of them, true hæmatics—*i.e.*, they restore the blood to its normal condition.

A peculiarity of rheumatism is that, when localised, it is frequently relieved by motion; the rheumatic whose first movements are productive of agony, will get along pretty comfortably after he has been moving some time. This is well known in horses the subjects of "jack spavin," which is really a rheumatic exostosis. Other rheumatics can work all day in comparative ease, but toss nearly all night instead of sleeping. This is often the case with the hands and arms of washerwomen; it may, however, be made a question whether this is always rheumatism or not; for it may be often a form of myalgia—but of that anon. When thus localized, it affects certain parts, and there it sticks; in time changes of structure go on, and the sufferer, in addition, becomes crippled. This change may occur variously—a bony exostosis may bind together two sections of a joint, and, though most usual in compound joints, may occur in the lumbar vertebræ;—it may lodge itself in the tendons, and produce contraction and deformity; or it may lodge in the sheaths of nerves till effusion takes place, and, by compression, produce partial paralysis, as is often seen in sciatica. In this last condition the loss of power, and with it loss of sensation, complicates the diagnosis with some pressure or lesion in the nerve high up nearer the trunk. There is a great tendency for rheumatism to lodge itself in parts that have been injured—as a dislocated joint, a bruise or crush, or to linger round a pleuritic adhesion; and in accidents occuring to the congenital rheumatic, the painful consequences are often rather to be dreaded, and if possible averted, than the injury itself. As a blood disease it may show itself anywhere; it may attach itself to one place and persistently remain; or it may flit about without a fixed residence, and may simulate many other disorders—and it may be simulated in its turn. With local affections it is often confounded, and too frequently persistent local pains, indicative of serious mischief, may be allowed to pass unheeded as rheumatism. This is unfortunately the case, sometimes, with ulceration of the articular cartilages, and with osteal and periosteal affections; and when any doubt exists, great care should be taken to watch the nocturnal exacerbations, the shiverings, &c. In Langenbeck's "Archives," No. ix., is related a case of periostitis and osteo-myelitis of the femur, which was mistaken for rheumatism. The pain in the right shoulder, symptomatic of hepatic disease, and especially of an abscess approaching the serous surface of the liver. and the sympathetic pain down the left arm in some cases of heart disease, are often carelessly looked over, and their significance unheeded, by classing them

as rheumatic. Intercostal rheumatism has included pleurisy, pleurodynia, broken ribs, herpes, neuralgia, the peculiar pain generally of the left side found in women, and so strangely connected with menorrhagia and leucorrhœa; the pain in either side, which is intimately connected with debility and anæmia; and again is confounded with that condition of pain and soreness of the muscles developed by overwork, and attended with both muscular and cutaneous hyperæsthesia, designated by Inman "myalgia." This condition of the interosseous muscles is probably often the real condition of the washerwomen's hands mentioned above. This pain, from stretching the white fibrous tissue, usually unyielding, is most agonizing, and was empirically applied by our forefathers in the rack and other methods of torture. But beyond all other pains, localised or otherwise, spontaneous or feigned, for simulation and dissimulation, is unquestionably, lumbago. To say nothing of its being confounded with abdominal aneurism, intravertebral cancer, disease of the spinal cord, renal congestion, abscess, renal calculus, nephralgia, lumbo-abdominal neuralgia, sprains, &c.; it is often assumed to be present when the patient is really suffering from "weak back"—*i.e.*, pain evoked in the muscular sense, and conveyed by the muscular nerves of sensation from the weight of the head and shoulders hanging on the erector spinæ. This state of over-tension is exquisitely painful, and is often quickly relieved by taking off that over-tension by the horizontal posture; it is intimately connected with growth, and with hysteria from hyperæsthesia. It is usually undistinguishable, locally, from congestion of the venous sinuses of the lumbar vertebræ, but the difference can sometimes be demonstrated by the treatment. For instance, the cure for lumbago, so fashionable a few years ago, by croton-oil, was really a rapid unloading of the bowels and relief to the congestion, and was not productive of any good in genuine rheumatism. On this subject, Copland states that true rheumatic lumbago is not connected with affections of the lower limbs, as cramps, numbness, pricking or lancinating pains, &c., which follow on lumbar-venous congestion. Rheumatic sciatica has included structural lesions, neuritis, neuralgia, specific and non-specific; while rheumatism in the neighbourhood of the anterior crural nerve is often really pain produced by the compression of the nerve by a load in the cæcum. Uterine rheumatism is often a misnomer for obstructive menorrhœa, and sometimes even for carcinoma. Rheumatic headache stands responsible for a deal of diagnostic carelessness, and has thus lead to a great deal of direct and indirect mischief. Rheumatism, in fact, has been made a respectable cloak for everything that is painful, from orchitis to bruises.

Non-localized rheumatism is as liable to mistake nearly as its

localized congener, and is confounded with general neuralgic hyperæsthesia, hysteria, alcoholism, tertiary syphilis, lithiasis from granular kidneys, locomotor ataxy, &c. From hysteria it may be distinguished by the general aspect of the case—hysteria occurring in young females, often of hyperæsthetic temperament, or of evident delicacy, who are rarely the subjects of true rheumatism. From neuralgia it cannot easily be descriminated always. In neuralgia, however, there is no acidity of the secretions, and some rational symptoms may assist to determine the question. Neuralgia is usually connected with the distribution of a nerve or group of nerves: there is too, according to Trousseau, tenderness over the spinal process where the nerve emerges from the spinal canal and brought out by pressure; while Valleix advanced the theory that there were special "tender spots" over the distribution of the nerve. An intermediate form of rheumatic neuralgia is not uncommon—a disorder in which there may be both a rheumatic and a neuralgic element, and where the acidity is very slight—in fact, a species of hybrid requiring a treatment as composite as itself. Professor Leudet, of Rouen, has described a variety of chronic alcoholism, in which the predominant symptom is pain, which may vary in intensity, be deep-seated or superficial, and accompanied by anæsthesia or acinesis, cramp, and increased reflex movements in the lower limbs. Mr. Higginbotham, of Nottingham, has described a similar condition under the name of alcoholic rheumatism, which used at one time to puzzle him greatly, but which, in time, he got to connect with alcoholic excess; and which, in fact, depended on it, being irremediable except by abstinence, and which has entirely disappeared on the sufferers becoming total abstainers. This affection, though necessitating a peculiar treatment in accordance with its cause, is a form of genuine rheumatism, as it is intimately associated with the use of fermented alcoholic liquors, where an acid is easily generated, and does not seem a concomitant on the use of distilled spirits, which not readily undergo acetous fermentation. Mr. Higginbotham says that, even where structural change has gone on, relief from suffering may be obtained by abstaining from the exciting cause.

Closely allied to chronic rheumatism in character, causation, and chronicity, are the pains accompanying granular or contracting kidney. This form of renal disease is essentially chronic, and carries with it a train of symptoms which as yet are not clearly understood, especially as regards the symptom chiefly under consideration here—viz., pain. It is not to be distinguished from rheumatism by any casual observation, and perhaps sometimes will escape the most careful scrutiny.

Intimately associated with the retention of uric acid, thus causing an acid reaction of the secretions and excretions—a blood-poison, thus manifesting itself anywhere—its resemblance to chronic rheumatism is nearly complete. No absolute distinction can be positively drawn except from examination of the urine; but in this form of renal disease albumen is often absent for long periods together, and thus the readiest witness is wanting. The urine varies greatly, however, in quantity, and when great in quantity is usually of low specific gravity, and contains granular casts, which, however, are often few in number and not easily found. When found they settle the question as to the presence of renal disease. An absolute diagnosis is, however, not always attainable. We are then thrown back upon the rational symptoms, and the distinguishing characteristics may be found to run somewhat in the following direction:—Rheumatism is associated with the fibro-serous textures; in lithiasis the poison has more affinity for the true serous surfaces, and is often the cause of pleurisy and peritonitis. Lithiasis more affects the muscles, and rheumatism rather the large joints. Diarrhœa, vomiting, and other affections of the mucous membranes, as bronchitis, accompany lithiasis; and in these it differs from rheumatism. Lithiasis is accompanied by headache, especially of the vertex (persistent and recurring vertical headache is almost pathognomonic of lithiasis), or the pain may be frontal. There is often, too, a want of power to collect the ideas so as to interfere somewhat with the patient's pursuits, if of an intellectual kind. In lithiasis there is a wakefulness at night, not entirely due to the pain, while frequently there is cardiac depression from the blood-poison, closely allied to that caused by the biliary acids when circulating in excess, but not characterized by such severe palpitation as occurs in biliousness. In this it differs from rheumatism. There are, too, in the skin manifestations of lithiasis; and the various pricking eruptions, and that irritable condition of the skin intimately connected with recurring erysipelas or erythema in elderly people, are part of its results. These patients are readily acted on by cold, and exposure of the face to a cold wind almost set it in a blaze; and the cold, so called, thus caught is accompanied by an inflammatory swelling of the face,—in fact, renal dropsy of a passing character.

It behoves us, then, to look more carefully into the cases of chronic rheumatism, as there is ground for strong suspicion that many of our chronic rheumatics (so-called) are really sufferers from a very serious form of renal disease.—*Edinburgh Medical Journal, Feb.* 1870, *p.* 684.

DISEASES OF THE NERVOUS SYSTEM.

10.—ON HEMIPARAPLEGIA.

By Dr. C. E. BROWN-SEQUARD, F.R.S., &c.

I have, I think, positively proved that when a lesion exists in a lateral half of the dorsal region of the spinal cord, above the dorso-lumbar enlargement, if there is a paralysis of voluntary movement, this loss of power is in the lower limb on the side of the lesion. I can go farther, and state that many clinical facts establish, beyond any possibility of doubt, that a lesion, wherever located in the length of the spinal nervous centre, but limited to one of its lateral halves, if it produces paralysis, invariably causes it in the muscles on the side of the lesion receiving their nerves from the parts of that nervous centre below the seat of the alteration. We may therefore conclude, in cases of paralysis of one of the lower extremities, that, if it is caused by a lesion in the spinal cord, this organic alteration exists in the side where the loss of movement is found.

I have also proved, by the decisive cases of Monod, Charcot, and Ore (*Lancet*, Sept. 25th, 1869), that when a lesion produces paralysis in a lower limb, in consequence of the alteration it causes in one of the lateral halves of the spinal cord, in the dorsal region, above the dorso-lumbar enlargement, if it causes anæsthesia of tactile and painful impressions, it is in the non-paralysed lower extremity, and not in the paralysed limb, that we find this loss of feeling. As regards sensibility, therefore (at least the two kinds of that faculty I have just named), the opposite side of the body is that where it is lost in cases of lesion in the dorsal region of the spinal nervous centre, as it is also in cases of lesion in the cervical part of that centre, according to the demonstration I have given in my lecture on Spinal Hemiplegia.

Consequently, if in a case of organic disease of the spinal cord we find these very peculiar symptoms—first, paralysis of one of the lower extremities, with conservation of sensibility to tactile and painful impressions, and secondly, loss of these kinds of sensibility, with conservation of voluntary movements in the other lower limb,—we may conclude that the cause of these symptoms is in the lateral half of the spinal cord, on the side corresponding to that of the paralysis, and opposite to that of the anæsthesia.

From the study of a number of cases of hemiparaplegia, I can state that when this affection is complete—*i.e.*, when all

the symptoms it can afford co-exist,—it is characterised by the following features:—

(a) On the side of the lesion in the spinal cord:

1st. Paralysis of voluntary movement.

2nd. Loss of the muscular sense.

3rd. Hyperæsthesia to touch, to pain, to tickling, and to heat and cold.

4th. Perfect knowledge of the place on which is made an impression.

5th. Vaso-motor paralysis and elevation of temperature.

6th. Existence of anæsthesia in some parts, or in a small zone, between the upper limit of hyperæsthesia, and the healthy parts of the body.

(b) On the side opposite to that of the lesion:

1st. Conservation of voluntary movement, and of the muscular sense.

2nd. Anæsthesia to touch, tickling, pain, and heat and cold. —*Lancet, Dec.* 25, 1869, *p.* 867.

11.—IMMEDIATE RELIEF AND RAPID CURE OF SCIATICA BY HYPODERMIC INJECTION OF MORPHIA.

By Dr. HENRY LAWSON, Assistant-Physician to St. Mary's Hospital.

It may be as well, perhaps, to explain both why I have taken up sciatica as a subject for a communication to our leading medical journal, and why I have expressed such very decided opinions as to the fallacy of the method of treating it hitherto in vogue, and the vast importance of attending to one symptom —that of pain. I must mention, then, that I am myself an old sciatica sufferer, and that in my own person I have supplied what I believe to be the most obstinate and dangerous case of this affection that I am acquainted with. I shall give the details of my case among the records of typical instances at the end of this paper, but *en passant* I may mention that the pain along the course of the sciatic persisted for more than six months; that it first reduced me to the employment of crutches, and then absolutely prevented locomotion; that the limb became permanently flexed and terribly wasted; that nearly every remedy in the pharmacopœia, and many out of it, were tried in vain; and that at last, under the advice of Mr. Ernest Hart, subcutaneous injection of morphia was attempted, and with the most signal and immediate success. Indeed, I am not outstepping plain matter of fact when I assert that to the method of treatment proposed and most patiently carried out by that gentleman I owe my restoration to health. For six

months I had hardly known what sleep was, notwithstanding the administration of opiates three and four times a day. Appetite was utterly lost; physical power was prostrate; mind, through long suffering, was enfeebled to that degree that I look back upon that period of my existence with astonishment and horror. I was, indeed, fast sinking into the grave, a victim to what the philosophy of modern physic styled a symptom, and which it was not considered necessary to deal with in any but a secondary degree. Five minutes after the first injection of morphia I experienced the only ease I had known for nearly seven months, and I need not say that by a continuance —necessarily protracted in so grave a case—I was in a few months restored to perfect health. From that moment I determined to seek out cases of sciatica, and afford to the suffering that blessed relief from pain which only those who have gone through many dreary nights of sciatic agony can realise. I have now accumulated over thirty cases of true sciatica; and while I have found other remedies do less or more benefit to the patients, I have never found any effect a cure and remove the pain except the salts of morphia, administered hypodermically and locally. They have never failed. In some instances they require to be maintained and persevered in; but they give instantaneous and effectual relief. They never impair nutrition —indeed, they promote it indirectly, and in recent cases they effect a cure so rapidly that the result seems, almost like a charm to the pain-worn patient.—*Medical Times and Gazette, Dec.* 4, 1869, *p.* 654.

12.—ON THE TREATMENT OF TRAUMATIC TETANUS BY THE CALABAR BEAN.

By Dr. EBEN WATSON, Professor of Physiology in Anderson's University, &c., Glasgow.

[The patient, who was a strong young workman, 27 years of age, trod on a rusty nail, which ran up into his foot, inflicting a very painful wound. Tetanus soon appeared. In the treatment adopted, with the exception of an occasional purgative and appropriate diet, he took no other drug but the Calabar bean.]

I must, however, call attention to the manner in which this drug was administered. It was not slavishly given in certain quantities and at certain times; but I had the patient watched day and night by my house surgeon, or some of the other assistants resident in the infirmary, and by non-resident dressers, who took the duty by turns. I could thus direct the treatment intelligently from hour to hour according to the patient's state.

We soon established the fact that it required two grains of the alcoholic extract of Calabar bean to produce any good effect in this case, and that dose was given in solution as a weak tincture; but the intervals of administration were very various. At the height of the disease, and during its many exacerbations, I frequently ordered the above dose to be repeated every quarter of an hour for three or four times till relaxation was produced, which it never failed to be; and then the usual intervals of half an hour or a whole hour were resumed.

Again, sometimes his stomach rejected the drug, it being squirted up violently rather than vomited. On these occasions I directed that double the quantity should be given by injection into the rectum, and for this purpose a solution of the extract in starch water was employed with success. I may mention here, that in this and other cases I have employed the method of subcutaneous injections, but in my hands they have not produced any very decided or reliable effect.

But the important *new fact* which this case establishes is the freedom with which the drug may be used in such cases, and of this I shall give some idea by the following epitome.

The whole duration of the disease, from its commencement to its cure, was forty-six days, and of these he was under treatment by the Calabar bean for forty-three. During these days he took the following enormous quantities of the extract.

During the first three days and nights he took twenty-three grains of the extract, in rapidly increasing quantities; thus he took two grains during the first twenty-four hours, eight grains during the second, and thirteen during the third such period. These doses merely sufficed to keep the disease in check. They never produced decided relaxation.

I then employed a very pretty tincture made by percolation and obtained in Edinburgh, but it did not seem strong enough for our case in the doses ventured upon (ℳx to xx); I therefore gave it up in a few hours, because no one can be certain of its exact strength, and I returned to the tincture of the extract mentioned above.

For the next seven periods of twenty-four hours, he took in each period sixteen grains of the extract; then the quantity was increased to forty-eight grains in twenty-four hours; and in the next twenty-four hours to fifty-seven grains. Next day and night he was easier, and took only forty-two grains; but next he was again worse, and took the very large quantity of seventy-two grains. He did not lose any part of these doses, but took them all by the mouth and retained them. They were all needed to keep him only moderately relaxed, and it is noteworthy that no disagreeable effect was produced by the bean, but its action in relaxing the rigid muscles was quite obvious.

Next day and night the quantity used was forty-eight grains, then forty-four, then thirty, then twenty-four; but, apparently owing to a strange obstreperousness in his behaviour, as for instance his insisting upon coming out of bed and lying on the floor, he became worse, and required the bean to the amount of fifty-four grains, during the next twenty-four hours. This, however, had a disturbing effect on his heart, which became tumultuous in its action. He was likewise very sick and pained in his bowels; hence for a few days the bean was given by injection into the rectum, as was formerly mentioned. However, he gradually improved, so that the quantity of the bean given was soon diminished to thirty grains, then to twelve, then to six, once more rising to twelve grains for one day, and again falling to four, and finally the drug was stopped altogether on the 26th of January, and I am glad to add that the man is now perfectly well, and fast recovering the strength he had lost in his fearful struggle for life.

A curious circumstance remains to be told, not connected with the Calabar bean, viz. that after the man's recovery a small suppuration took place in the foot at the seat of the original injury, and when this was opened a small bit of leather was extracted. This was evidently part of the sole of the boot, which had been carried into the foot on the point of the nail, and remained there till it excited suppuration and was expelled. I have wondered if the presence of this irritating substance was the cause of the protracted nature of this case, and if it would have been more easily and more speedily cured had it been extracted sooner. No doubt the practice of formal incisions with the view of dividing the nerves of the wounded part have failed to arrest tetanus once it has been established; but as many such cases present themselves with the wound thoroughly cicatrised, it may be questioned whether it might not be good practice to cut through the cicatrix so as to explore it and make sure that no foreign matter was imbedded beneath it. The very incision might relieve irritation, and at all events could do no harm. I would recommend that this should be borne in mind by surgeons, as a practice authorised by the present case, wherever there is the slightest possibility of foreign matter being enclosed within the cicatrix of a wound causing tetanus.

But to return for a moment, in conclusion, to the main object of this paper: I beg to press on the attention of my professional brethren the safety of a very full and free administration of the Calabar bean in traumatic tetanus, if only two conditions be fulfilled: viz. 1st, That the patient be well and intelligently watched, so that the drug be given really as often and as much as the patient requires at the time; 2nd, That his strength be well supported by fluid nourishment and stimulants. Now, the

relaxation produced by the bean enables the patient to swallow fluid food, and therein consists its superiority to all other relevants, such as chloroform and chloral for instance, which prevent the taking of food. I am encouraged to hope that, given as I have directed, the Calabar bean may yet be found as certain in the cure of tetanus as strychnine is in its production.

I may add that, in the treatment of this case, not less than 1026 grains of the alcoholic extract of Calabar bean were, one way or another, introduced into the patient's system; and if each grain of the extract is equivalent to sixteen of the powdered bean, the quantity given would represent fully thirty-four ounces of the latter. As the beans, on an average, weigh about sixty grains each, it would take 272 beans to yield the requisite quantity of the powder, but I suppose that more than these would be actually consumed in the preparation, as the rind would have to be excluded.—*Practitioner*, *April* 1870, *p.* 207.

13.—CASE OF TRAUMATIC TETANUS TREATED BY SUBCUTANEOUS INJECTION OF CALABAR BEAN.

By Dr. WILLIAM HAINING, House-Surgeon to the General Infirmary, Chester.

J. R., aged 29, a strong, healthy-looking labourer, of steady habits, was admitted into the General Infirmary, Chester, under the care of Mr. Watson, on the 1st of June, 1869, his right foot having been completely crushed under the wheels of a locomotive engine. The lower half of the leg being quite emphysematous, and the veins, as high as the inner side of the knee, presenting a varicose appearance, amputation was deemed unadvisable at the lower third of the leg, and was performed by an anterior and posterior flap at the "seat of election." Although a good deal of blood had been lost by the patient, he progressed very favourably until the seventh day after the operation, when the lower border of the anterior flap assumed a gangrenous appearance, which rapidly spread, until in a few days the whole flap sloughed off on a level with the exposed end of the tibia. The posterior flap, which remained quite healthy, was then firmly strapped forward, and the process of cicatrisation proceeded very favourably from below, the edge of the anterior flap remaining for three weeks hard and abruptly defined.

On the evening of the 17th slight stiffness about the neck was complained of; and on the following morning the mouth could be opened scarcely wide enough to admit of the tip of the tongue being protruded, the neck being so rigid that the head could not be bent forwards or turned to either side. The face

bore the usual tetanic expression of great suffering, although the patient was conscious of nothing more than slight uneasiness. Towards evening there was a good deal of twitching in the muscles of the stump, and a very perceptible amount of opisthotonos. The strapping was removed from the wound; the bowels, which had not been opened for two days, were freely opened; and one-grain doses of the extract of Calabar bean were given every three hours. On the 20th, the symptoms having increased in severity, the doses were doubled in strength, each being followed, in rather less than an hour, by complete relaxation of the jaw. On the 22nd the abdominal muscles were very rigid, the back arched, and the stump twitching violently; but three-grain doses of the extract completely relieved all spasm. During the night, however, there was a great deal of nausea, with occasional vomiting; and as, on the following morning, the mouth was so firmly closed, that no food could be taken until about an hour after each dose of the medicine, the subcutaneous was substituted for the internal administration of the remedy, an injection of half a grain producing a more speedy but less permanent effect than the dose of three grains. The injections were gradually increased in strength until, on the 8th July, they amounted to forty-one grains within little more than twenty-four hours; the largest individual dose being six grains. On the 29th June they were purposely omitted for ten hours, at the end of which time the patient was in a very distressed condition, the jaws being firmly clinched, the abdomen as hard as a board, and the body so arched that it rested entirely on the back of the head and the lower part of the left leg. An injection of three grains gave complete relief in about seven minutes.

On the 4th of July the last ligature came away, and on the same evening, and once again two days afterwards, the left leg became cold and numb, feeling, as the patient expressed it, "quite dead;" but there was no obstruction of the arterial circulation through it. Just before the spasms began to be severe, micturition was imperfectly performed, the urine being expelled painfully and in sudden jets. From the 7th till the 12th the injections were required from seven to nine times in the course of twenty-four hours, their frequency being ruled by the permanence of their effect. There was no complete trismus after the 4th, although opisthotonos continued gradually to return in from two to four hours after each injection, by the puncture of which it was always momentarily increased. On the 13th there was a decided remission in the severity of all the symptoms accompanied by slight delirium, and a rather tympanitic condition of the abdomen. On the 14th the tympanitis was very distressing, the opisthotonos being slight; but the

abdominal symptoms gradually subsided after the repeated use of turpentine enemata. The doses of extract, which had been much lessened from the 13th, were on the 19th altogether discontinued; and from this date the patient made such uninterrupted progress, that on the 24th he was able to be out of bed, feeling very weak and shaky, it is true, but quite free from all tetanic symptoms, and with the stump, which had cicatrised very slowly, and from which a small exfoliation from the tibia had been extracted, completely healed over. A day or two before the occurrence of the tympanitis a number of small wen-like abscesses appeared over the chest and left arm, where the injections had been most frequently made, but they speedily healed up after having been evacuated by puncture. Besides the Calabar bean no other drug was employed, the patient's strength being maintained by a good nourishing diet, for which there was a tolerable appetite after the action of the bean had been fairly established.

It can scarcely be doubted that this was a case of tetanus, of no very mild type. The onset of the symptoms, eighteen days after amputation, was somewhat sudden, and, occurring several days after removal of the anterior flap, when the stump appeared to be healing kindly, it was certainly unexpected. The cause of the disease was probably connected with the delay in the separation of the ligatures, as well as with the irritation which results from the change occurring in the condition of the muscular and nervous tissues during the process of cicatrisation. In the *American Journal* for last October a case is reported in which tetanus occurred three weeks after a double amputation, when the stump had quite healed up, except at the point at which the ligatures came out, the symptoms, after two days' duration, abating on removal of the ligatures. In the present case, the three ligatures came away respectively on the twenty-sixth, twenty-eighth, and thirty-third days after the operation; and though a decided remission of the symptoms took place within a week after removal of the last one, it might be rather too much to say that it was consequent upon it, as by that time the process of cicatrisation was completed.

The antagonistic effect of the remedy upon the well-marked trismus and opisthotonos was immediate and complete. The arched back, painfully tense abdomen, quivering limbs, and anxious countenance, were generally relieved in from five to ten minutes after each injection, by comfortable decubitus, a feeling of drowsy ease, and during the night by short snatches of sleep. The frequency of the injections, as well as their strength, was so regulated by careful attention as to keep the spasms thoroughly under control. For this purpose repetition of the injections was necessary, sometimes every two hours, at

other times not oftener than once in six hours. During the whole of the time the patient was under the influence of the bean the pupils were very much contracted, the skin was bathed in perspiration, and daily free evacuations were obtained from the bowels. The effect of one or two of the larger doses, administered when the symptoms were not so severe, was to produce nausea and vomiting, involuntary purgation, and a feeling of great depression, with fibrillary spasms of the muscles, especially those of the face, marked slowing of the pulse, and most profuse perspiration. The injections were made over both arms and shoulders, and over the chest, abdomen, and left thigh, but in the latter situation their effect did not seem to be either so well marked or so rapidly produced.

The total quantity of extract used between the 18th of June and the 19th of July was a few grains over ten drachms, the preparation ordered being that made according to the British Pharmacopœia. As the doses required were sufficiently large to justify doubts as to the purity of the extract used, specimens were obtained from three different firms, whose names ought to be a guarantee that their preparations were as genuine as the present irregular commercial supply of the bean will allow.

That a few small abscesses should result from over 140 punctures is scarcely surprising, although the solution injected was made slightly alkaline by the addition of bicarbonate of potash, and was in that condition found to be less irritating than when merely neutralised by carbonate of soda.

From the results obtained in this case it may not be too much to infer that in tetanus the administration of Calabar bean should not in any case be limited to effect mitigation of the symptoms, but should be perseveringly continued in doses gradually increasing in frequency as well as in magnitude, until either the tetanic spasms are completely overcome, or the physiological effects of the drug are manifested to a dangerous degree. Once having obtained complete relaxation, it seems far from improbable that, in a large proportion of cases, careful, free repetition of the doses on the return of the least appearance of spasm, may enable us to maintain complete control over the symptoms, until their cause becomes much enfeebled or is altogether removed.

Note.—Since the foregoing notes were written, the patient from the breaking of one of his crutches, fell heavily on his stump, bruising it very much, and cutting it transversely through the whole breadth of the cicatrix, so that the end of the tibia was exposed. Owing to the great extent of cicatrised surface, the process of reunion proceeded very slowly, and was further delayed by the exfoliation of a small piece from the

end of the exposed bone. Three weeks after the accident, he was enabled to leave the hospital for the country, and there is now but a small extent of surface unhealed, whilst his general health, as evidenced by his physical appearance, seems better than it has ever been.—*Lancet, Dec.* 18, 1869, *p.* 834.

14.—NITRITE OF AMYLE IN TETANUS.

By M. FOSTER, Esq., Huntingdon.

The treatment of traumatic tetanus is so empirical, and the favourable results of any medicine are so problematical, that it appears legitimate practice to use any *likely* remedy. In a practice of thirty-four years I have seen seven cases, all of which proved fatal, until this time I prescribed nitrite of amyle inhalation. I was induced to try it from its supposed property of alleviating the spasm of angina pectoris, and for which I had previously secured a supply.

J. B., aged fifty-two, publican, smashed the third finger of his right hand on Dec. 11th, 1869. He was exposed to much wet and cold on the 20th; felt himself very ill on the 22nd, complaining of stiffness of the jaws. My partner, Mr. Lucas, saw him on the 23rd, when tetanus was setting in fast. I saw him on Christmas-day. At this time his jaws were fixed, and on the recurrence, very frequently, of tetanic spasms, his body was rolled up into a rigid ball. I gave him five drops of the nitrite on a handkerchief. The inhaling of it had an immediate effect in lessening the spasms. Directions were left to administer the same on each return of the spasms. This was assiduously done by his wife. From that time onwards the spasms were *held in check* until the ninth day, when he had inhaled an ounce, and the case might be said to be reduced to a semi-chronic state, with a fair prospect of recovery. He was most *thoroughly* supplied with nutrients, a few stimulants, tonics, and aperients. He gradually improved until the end of the month, when he was convalescent.

His perfect recovery to health has been retarded by some attacks of catarrh and congestion of the lungs; otherwise he is well.

I know it is foolish and rash to pronounce any treatment satisfactory upon a single case, such as this; and it is for the profession to try its influence, for good or otherwise, in other cases, as they may arise.—*Lancet, April* 9, 1870, *p.* 533.

15.—TRAUMATIC TETANUS CURED BY CHLORAL.

M. VERNEUIL has presented a note to the French Académie des Sciences, by the hands of M. Wurtz, in which he observes

that, experiment having established the fact that chloral is antagonistic in its action to strychnine, it might almost be anticipated that it would prove useful in tetanus. And this hope seems to be realised, for M. Liebreich has already reported a case of rapid recovery from trismus under its use. A second still more demonstrative instance is afforded by a case that has just occurred in the Lariboisière Hospital. The patient was a young and healthy mason, who at the end of January crushed the extremity of the right radius with a stone. On the eighth day tetanus supervened, and quickly extended to the muscles of the face, jaws, neck, spine, abdomen, and lower limbs. The pain was intense and persistent. Subcutaneous injections of hydrochlorate of morphia, and the internal use of chloral, were simultaneously employed. The action of the latter was prompt and decisive, the contraction of the muscles diminishing, and the pain being allayed almost instantaneously, succeeded by long and profound sleep. The chloral being intermitted, the symptoms reappeared, to vanish again as soon as it was recommenced. A month elapsed before complete recovery took place. The daily doses amounted to from one drachm and a half to three drachms, administered in water. No derangement of the stomach was produced, and the patient was able to digest easily a very abundant dietary. A case of a similar nature is reported to be under the care of MM. Dubreuil, Lavaux, and Onimus.—*Lancet, April* 16, 1870, *p.* 560.

16.—A CASE OF SEVERE CHOREA DURING PREGNANCY SUCCESSFULLY TREATED WITH HYDRATE OF CHLORAL.

By Dr. JAMES RUSSELL, Physician to the Birmingham General Hospital.

[Seeing that in the severer forms of chorea life is threatened from the exhaustion caused by want of sleep, we can hardly conceive any remedy so likely to be of service as chloral.]

E. M., aged 21, a healthy, vigorous-looking young woman, was admitted into the Birmingham General Hospital on Oct. 29. She was nearly five months advanced in pregnancy with her first child. Choreic movements developed themselves from an unusually early period of gestation, almost from the beginning. It was asserted by her husband that she exhibited some irregular movements of the hands before marriage, but this assertion the patient most positively negatives. For the last three weeks, and especially for the last fortnight, the movements have become very violent, so that she was quite unable to stand, and was confined to her bed. They commenced in the left arm, and

subsequently became general, Her eyes were "set," and the globes often "worked." She had difficulty in opening her mouth, and the masseters were observed to twitch. She quite lost the power of articulating, though she retained that of swallowing. Her sleep also was very much disturbed. She had never suffered from rheumatism, though a sister had been laid up with rheumatic fever. Her heart was healthy, her urine was free from albumen.

At admission she presented a very aggravated form of chorea, the limbs and trunk being tossed at intervals with frightful violence; articulation was practically extinguished, but she swallowed fairly; the pupils were contractile and of medium size; her mind was clear, but she was exceedingly emotional.

Full doses of bromide of potassium failed entirely, and her first night in the hospital was passed with only an hour and a half of sleep. At noon, on October 30, Dr. Welch, our house-physician, administered the hydrate of chloral, and during the ensuing twenty-four hours she took seven doses, the first two of ten grains, the succeeding ones of fifteen. The first two doses procured some sleep, but after the third the sleep became more continuous, lasting successively for three, five, and three hours and a half. Whilst she was awake, the movements, though occasionally violent, were much lessened, and she spoke distinctly; she was also able to protrude her tongue; she took liquid food.

Thirty grains of chloral at 6 p.m. on the 31st were followed by two hours' sleep, but pain, seated apparently in the uterus, kept her awake during the remainder of the night; the movements returned in the morning with much violence, chiefly in the trunk and extremities, speech was again interrupted, and she became much excited. Nutritive enemata were now ordered on November 1, each containing six grains of quinine, with cod-liver oil; and two doses of tincture of opium, of thirty and forty minims respectively, were also administered by the rectum, the chloral being suspended. Although she was quiet during November 1, the smallest excitement threw her into instant convulsion, and during the night, though feeling a great desire to sleep, she was unable to close her eyes. The uterine pain subsided.

On November 2, after twenty grains of chloral at noon, she slept with little intermission till 9 p.m., when the dose was repeated, and she slept through the whole night; she told us next morning that she had enjoyed more sleep during that night than she had through the entire preceding month. She was almost perfectly quiet; her pupils were of medium size and contractile. Pulse was 104. She laughed and was in good spirits, but complained of inability to chew. She again took

two doses at 5 and 9 p.m. of November 3, and slept from the former of these hours until two a.m., with one interval of an hour and a half. We found her in the morning perfectly quiet, though a little fidgety, and her speech completely restored.

The same treatment on the evening of the 4th procured ten hours of nearly continuous sleep, and the sleep continued through most of the following day. She now began to feed herself. The following night (of the 5th) the remedy nearly failed to give sleep; but on the 6th a single dose was perfectly successful. On the 7th no chloral was given; the night was sleepless. A single dose on the evening of the 8th gave sleep through the entire night, and next morning she carried liquid food to her mouth, talked well, and protruded her tongue perfectly.

The chloral was discontinued on November 10. She had begun to walk, though in a very imperfect manner until Nov. 25. She took every four hours fifteen minims of the tincture of hemp; she steadily improved in walking, and had good nights. From the 18th she began to sit up, and from Dec. 3 spent a considerable part of the day out of bed, walking with fair facility, talking naturally, and presenting only the usual characters of a mild attack of the disease. She had emaciated partly, but otherwise was in good health. She left the hospital on December 10, presenting only the symptoms of a mild attack of her disease.—*Med. Times and Gazette, Jan.* 8, 1870, *p.* 30.

17.—ON THE ACTION OF CHLORAL IN THE TREATMENT OF THE INSANE.

By Dr. JOHN B. TUKE, Medical Superintendent of the Fife and Kinross Lunatic Asylum.

Being desirous of ascertaining what influence the hydrate of chloral might have in the treatment of insanity, I instituted a limited series of experiments on certain patients recently admitted, and also on some old-standing chronic cases.

I selected, first, a case of chronic alcoholism characterised by acute mania; second and third, two cases of asthenic insanity, both symptomatised by melancholy; and, fourth, a case of climacteric insanity, characterised by melancholy. There was no other recent case in the asylum but the one mentioned in which maniacal excitement existed, otherwise chloral would have been employed.

In order to be able to test most fully the action of the medicine, these four patients were placed under special observations for three days previous to its administration; accurate notes were taken of the temperature, pulse, respiration, and

general condition, twice a day, and also the state of the urine, as to quantity and quality. For the next four days, half-drachm doses of chloral hydrate were administered at 10 A.M. and at 9 P.M., and observations taken at 11 A.M., 2.30 P.M., and 10 P.M., so as to enable me to judge of its immediate effects and the state of the patients during the interval. On the next three days none of the medicine was given, observations being still continued. Then for four days more, half-drachm (in one case two-scruple) doses were given as before, morning and evening. Subsequently half-drachm doses were administered at night, for a few nights, and then entirely discontinued. A short detail of each case will serve best to show the results.

Case 1. *Insanity of Alcoholism.*—Agnes G., aged forty-eight. During the term of preliminary observation this patient was more or less excited, sometimes very much so. The tongue was foul; appetite good; bowels open; never menstruated since her admission. The morning temperature ranged between 99·3° F. and 101·8° F.; the evening, between 98·4° F. and 99° F. Morning pulse 84, of fair quality; evening, between 80 and 90, of fair quality. Respiration 24 per minute. Urine highly charged with urates, acid, and with a specific gravity of 1030.

The administration of chloral in half-drachm doses had no effect in moderating the intensity of the mental symptoms. It produced considerable diaphoresis, and slight drowsiness for an hour or two, which soon passed off. The most marked effect was a sudden fall in temperature within an hour after exhibition. Thus, on the first day, one hour after the medicine had being taken, the temperature fell to 98° F., 99·3° F. being the average temperature at the same time on the three previous days. By 2.30 P.M. it had risen to 99·6° F., and at 9 P.M., an hour after the second dose, it had again fallen to 97·7° F.; and on the second day the temperatures were at the several hours 98·4°, 99·8°, and 97·8° F.

Three days were allowed to pass by without the medicine, During this period she was, on the whole, quieter, although at times noisy. On the medicine being resumed, two-scruple doses were given, with the same effect on the temperature, and, after seven doses, produced deep and continued sleep. The general character of the excitement was toned down, and after the drug had been persevered with in full doses at night-time for a further period of six days, the patient was very much improved

As this is her second attack, a cure is hardly to be looked for; but the change for the better is well marked, and, as she had been very maniacal for weeks before its administration, it may be fairly assumed that it mainly influenced the improvement. She is now quiet, works pretty well, her appearance and ex-

pression are much improved, she is conscious of her previous excitement, and she sleeps well in the general dormitory.

Case 2. *Climacteric Insanity.*—Isabella B., aged fifty-two. Second attack. Says her soul is lost; looks suspiciously around her; is easily startled; moves her head in a quick, jerky manner; sleepless at night. Bowels open; appetite good; tongue clean; urine pale and clear, slightly acid, specific gravity 1014. Morning temperature 97·3° F. to 98·3° F., generally lower than the evening temperature, which ranged between 98° and 98·4° F. Morning pulse 80, of good quality; evening pulse varying from 76 to 100, and of average strength and fulness. Morning respiration 18 to 20 per minute; evening respiration rather quicker.

Half-drachm doses of chloral were administered twice a day. Its effect on this patient was to produce a condition of semi-intoxication, followed by deep and refreshing sleep. She complained occasionally, on waking, of slight headache. The restlessness and startled look were much abated, and her appetite was not interfered with. Shortly after the dose was taken a moderate, warm perspiration broke out on her skin. The evening temperature was generally higher than in the morning, and the pulse improved in character. On the discontinuance of the medicine the restlessness returned to some extent, as also did the sleeplessness at night. On its resumption these symptoms disappeared, and now there is well-marked improvement in the case, although the chloral was not pressed more than four days on the second occasion.

Case 3. *Idiopathic Asthenic Insanity.*—Helen C., aged twenty-five, admitted in very bad bodily condition; feet œdematous; extremely melancholy; constantly crying and bemoaning her condition, and occasionally refusing food; bowels costive; tongue foul; temperature low, ranging in the morning from 97·1° to 97·4° F., and in the evening from 97·1° to 97·7°; pulse small and very varied in frequency, at one time being as high as 120, and next day falling to 64; urine pale and clear, 1010, neutral. Chloral was given in half-drachm doses. The effects were well marked after each dose. A sweat broke out, mild intoxication ensued, and then deep sleep. The temperature fell most markedly after each administration; on one evening, at 10 P.M., one hour after the dose, it fell to 95·8°, it having been 96·9° at 2 P.M. On all occasions there was a very well-marked fall. The pulse improved in character. The state of the urine was as follows: pale, slightly acid, specific gravity 1015. Her mental symptoms were much abated. She began to work; and although still miserable, began to see some hope for herself. On discontinuing the chloral, restlessness and irritability returned, which were again allayed on its

resumption. On the second occasion the medicine was administered for four days, and with good results. The patient is well on the road to convalescence, is employed as a housemaid, sleeps well, and is picking up rapidly in bodly condition.

Case 4.—Mrs. S., aged thirty-four. This patient had been insane for eight months previous to admission. She was noisy, night and day; crying, restless, and dementedly melancholy: a most distressing case, as she irritated the other patients, and kept the whole gallery in confusion. Judging from her appearance, her case was almost hopeless. The expression of the face was vacant and silly when at rest; hair wiry and dry; and language utterly incoherent. Bodily condition good. Temperature in the morning generally lower than in the evening, rising *pari passu* with her excited mental condition, being sometimes as high as 101·4° Fahr., and at others as low as 97°. Pulse 100, of fair quality. Respiration from 20 to 24. Urine high-coloured and clear; acid; specific gravity 1012.

The effects of chloral on this patient were very striking. After the sweat she fell into a state of maudlin intoxication and good nature; face flushed, slightly sick, eyes suffused, and gait unsteady. In about an hour she fell into a deep sleep, which continued for some hours. This was the invariable effect of each dose. The temperature generally stood high at night. The pulse ranged from 90 to 100, small; respiration 16 to 20; urine natural in colour, acid, and specific gravity 1026. On leaving off the medicine the old symptoms returned, although with not so great intensity. When resumed, it produced the same effects as at first; and on its second discontinuance the condition of the patient was much improved.

I have used chloral very frequently of late in chronic cases of insanity in which violent outbursts of excitement occur, and invariably with good results.

The insomnia of climacteric melancholy is much relieved by a half-drachm to a two-scruple dose at bed-time.

The advantages of chloral over all other hypnotics with which I am acquainted are—

1. That it is more uniformly certain in its action.
2. That it has no depressing influence.
3. That it does not cause constipation.
4. That it does not produce nausea.
5. That its effects are more lasting.

I believe it to be the most valuable means of procuring sleep which has yet been introduced into the Pharmacopœia of the asylum physician. The only difficulty is to ascertain the exact dose for each case; but this is obviated by beginning with half-drachm doses, and increasing them by ten grains till the limit is found.—*Lancet, March* 26, 1870, *p.* 443.

18.—CASE OF ACUTE MANIA SUCCESSFULLY TREATED WITH HYDRATE OF CHLORAL.

By Dr. GEORGE CRAWFORD, C.M., Port Glasgow.

[The patient was 56 years of age, and fourteen years ago had been confined in an asylum for nine months, on account of insanity. She had a similar attack five years ago, which lasted five months. On the present occasion, when first seen by Dr. Crawford, she had been ill five weeks, during which time she had never slept more than five minutes at a time. Opiates made her worse.]

After what had been done in the case, I considered it a good one for chloral, and determined to give it a trial.

I may state that, before giving the chloral, her pulse was 130 per minute, and the temperature of the body very high.

I gave her twenty-five grains in two ounces of water at bed-time for three consecutive nights, and its effects were quite marvellous. The first night she did not sleep much, but the talking was entirely stopped. The second night she slept for nearly nine hours perfectly sound and tranquil, and even during the following day she had several hours of refreshing sleep. The third night was equally as quiet, with as much sleep, and on the following day said she was quite better, and did not require any more of that medicine which made her so sleepy. Immediately after the first dose the pulse began to fall, until at the end of the third day it was down to 90, and during the same time the temperature gradually became natural. She did not complain of nausea, headache, or any other unpleasant feeling during the time she was taking it.

Since that time till now she has remained perfectly well, sleeping at night, taking her food, and attending to all the duties of the household as formerly.—*Medical Times and Gazette, Jan.* 22, 1870, *p.* 93.

19.—ON THE DIAGNOSTIC USES OF ELECTRICITY.

By Dr. J. RUSSELL REYNOLDS, F.R.S., Professor of the Principles and Practice of Medicine in University College.

Perhaps the most general diagnostic use that can be made of electricity is this: to determine, in a case of paralysis, or loss of voluntary power in a muscle or group of muscles, the cause of that paralysis up to this point, whether it depends upon some condition which shuts off from that muscle the influence of the spinal cord, or whether it be some change which, although it may paralyse the muscle to the will, does not remove that muscle from the influence of the spinal cord. Sometimes it is

of very great importance to be able to distinguish between those two conditions, and to recognise that one to which Dr. Marshall Hall applied the term "spinal paralysis." I must therefore occupy your time, for a few minutes, in explaining to you the exact sense in which Dr. Marshall Hall used that term. What he meant by it was, not necessarily disease of the spinal cord, but the separation of a muscle from that organ. It is clear enough that that separation may occur in two different ways; and, further, that disease of the spine may exist, and cause loss of voluntary power, and yet not produce what he termed "spinal paralysis." A muscle may be paralysed by something wrong in the tissue of the muscle itself; by something which cuts through the nerve that should connect it with the cord; by something which destroys that part of the cord from which the nerve arises; by something which destroys or cuts across the cord higher up than the origin of its nerve; or by something which damages the brain. Thus, then, there are five different lesions, or rather, localities of lesion, which may produce paralysis.

What Dr. Marshall Hall meant by "spinal paralysis" was the functional separation of a muscle from the cord. And here let me remind you that there is a condition which does not effect this separation, and yet which has sometimes been termed "spinal paralysis." If there be disease of the spinal cord above the origin of certain nerves which supply a group of muscles, there may be perfect paralysis of all those muscles, but there need not be any "spinal paralysis," in the sense in which Dr. M. Hall used that term. The paralysis is one depending upon disease of the spinal cord, but the particular nerves and muscles of which I am speaking may still maintain their normal relationship to a healthy portion of the cord, and the muscles under those circumstances still preserve their electric irritability.

There is, in this case, "cerebral paralysis"; the patient is deprived of the use of some of his muscles; the brain and the muscles are, so to speak, cut asunder; they are paralysed to his brain, but they are not paralysed so far as the spinal cord is concerned, though the lesion is in the cord itself. But if there be destructive change in the cord, at that particular locality from which the nerves of the supposed group of muscles are given off, the condition of those paralysed muscles is very different. Regarded merely in relation to the will, they present no difference—they are simply paralysed; but in the one case they are shut off only from the brain, in the other they lose all that was conferred on them by the spinal cord. Spinal disease exists in both instances, but it is to the latter only that Dr. M. Hall applied the term "spinal paralysis."

There is another way in which spinal paralysis may be brought about—viz., by the division of the nerve between the cord and the muscle, "traumatic paralysis," as it is sometimes called. By a neuroma, or other tumour, or by an accidental injury, a nerve may be damaged or cut through, and then the muscle stands, so far as its electric irritability is concerned, in the same position as in the case where the cord itself is destroyed at the point at which its nerves come off.

1. The most general principle that I can lay down for you in regard to electric irritability, used as a means of diagnosis, is this,—that when a muscle is separated from the influence of the cord, by destruction of its nerve, or by destructive disease of the cord at the origin of its nerve, it loses its electric irritability, it loses it quickly, and it loses it to all forms of electric irritation. The degree of loss or diminution may vary, but it varies directly in proportion to either the amount of interference between the cord and muscle, or to the degree of damage done to the cord itself. The clearest proof of the truth of this statement is to be derived from the fact, that of all the experiments made by Dr. Marshall Hall, and of all the conclusions he drew from them, whether the rest were right or wrong, this particular one has been regarded as correct by those who have the most carefully investigated the question.

(*a*) In brain disease *per se* there is no diminution in the contractility of the paralysed muscle to the electric current.

(*b*) In spinal disease, which is so situated that it does not destroy or damage certain nerve fibres which come off below the seat of lesion, and pass to certain muscles which may be paralysed, there is no necessary interference with the electric irritability.

(*c*) Spinal cord disease which damages a part of the cord diminishes the electric irritability of the muscles supplied by nerves coming from that portion.

(*d*) Section of a nerve which simply cuts the muscle off from the spinal cord produces a similar result.

2. Having said thus much about the aid which electricity may give to our diagnosis of the locality of a lesion, let me direct your attention to another matter, with regard to which I do not think there is always the clearest understanding. I refer to what one means by the terms "electric irritability," or "contractility," and "amount of electric irritability." Under this term two different things have often been confounded—viz., irritability and power, or readiness of contraction and force of contraction. For instance, take a person who has one of his arms paralysed, and place his feet in a dish in which there is some salt and water, and which is connected with the positive

pole of a galvanic battery, and let the negative pole, at your pleasure, be connected with one or the other of two basins, into which he puts his hands. The current will thus pass up his legs and down one or the other of his arms. Then, as you apply the current to the right arm or the left, you can discover which of those limbs, right or left, will respond to the lowest power. Supposing you have a galvanic battery, and you apply the current from five cells, and this produces no effect on the paralysed limb, but a distinct flicker in the muscles of the non-paralysed limb, you may infer that the irritability is greater in the latter.

3. In that manner you test the true irritability of the muscle—you ascertain its readiness of response to a low power. If muscle A will act to a current of five cells, and muscle B will act only to a current of ten cells, then muscle A is more irritable than muscle B. If the muscles of the right arm will act to a current of lower power than those of the left arm, then the muscles of the right arm are more irritable than those of the left. You must remember the difference of strength between the direct and the inverse current; and in testing the irritability of the two arms respectively, be careful not to send the current up the one arm and down the other, and lose sight of that fact in your interpretation of the phenomena. You often find when applying a strong current of electricity to two limbs, one of which is paralysed and the other healthy, that the muscles of the latter act much more vigorously than those of the former. You are not, however, to infer from such observation that the muscles so acting are more irritable, They are often less irritable than the others, but they are stronger, and when you put them into action they act more vigorously. In the one case you are testing irritability; in the other you are testing power. To ascertain, then, the irritability of a muscle—*i.e.*, to see how irritable it is—you must reduce the strength of the current you employ, whether faradic or galvanic, to the lowest point that will produce action. With a more powerful current, all that you will show is that one muscle is stronger than the other; for you lose sight of the finer differences of irritability in the obvious presence of the coarser differences of strength. If we take four or five cells of a galvanic battery, and apply the current, made and broken slowly, to a paralysed muscle, we often find that it will respond much more readily than will a healthy muscle, because it is more "irritable." But if we take thirty or forty cells, or a faradisation machine, we often find that the same healthy muscle will perhaps draw the hand out of the water, while the other (the paralysed muscle) will merely give a little jerk. The healthy muscle in this case, though less irritable, is more strong.

Another diagnostic use of electricity is seen in the distinction between certain imaginary, fanciful, or feigned conditions of paralysis, and those which are real. You are not, as I told you in the first lecture, to infer that a person is shamming because you detect no difference between the muscles on one side and on the other, when the patient asserts that he is hemiplegic, and appears to be so. The great use of electricity in such cases is this: that if you do find a definite, well-marked difference between the muscles of the two sides, you are justified in inferring that there is something more than mere fancy; something that cannot be feigned. For instance, it has often been said that, in cases of railway accidents, persons "put on" all sorts of symptoms; and so they do. There is no doubt that many symptoms are deliberately put on. But there are other cases in which people frighten themselves, or are frightened, into believing that there is something much more grave the matter with them than the facts really warrant, and so an injured person often becomes powerless from ideal influence, when not paralysed by disease; and here electricity may be of service. I remember an important case in which a physician and a surgeon in attendance upon a gentleman who was supposed to be paralysed on one side, as the result of a railway injury—although they were his own medical advisers,—had grave doubts about the reality of the paralysis. They thought the patient put on or imagined a great deal, and that his paralytic state was more or less fancied if not actually shammed. The persons on the side of the company said, unreservedly, that there was not a particle of truth in the apparent paralysis; that the patient was no more paralysed than they themselves were. And I must tell you that there were certain points about the case which led one to infer that the man was to a certain extent affecting some of his symptoms. Now here came in the electrical test. He could not move his right arm; he dragged his leg after him; he could not pronate or supinate his hand. Some said he could if he liked; but I would defy him to do what I am going to tell you. To his left arm I applied a strong faradisation, which knocked his arm round with an amount of pain that made him use strong language, which I need not repeat. I then applied it to the paralysed arm, passing the current through the pronators. There was not the slightest movement. Now, I do not mean to say that a very strong man might not, by a very strong effort, have kept his hand still; but I am quite sure he could not have prevented from acting the muscle that was between the two poles of the battery, any more than he could prevent his pupils from contracting upon exposure to light. I used the same current once or twice, and put it on considerably stronger; but there was only the smallest flicker of contrac-

tion in the muscles on that side. So with the leg. I applied it to the healthy leg, drew the foot up, and brought forth more exclamation; to the other leg, and the muscles remained perfectly flaccid, without the smallest contraction. Whatever may have been the doubts in that case as to what the man might have put on, I think we may take it for granted that he could not have put on that; for no man could resist, by a simple effort of the will, the action of a muscle to such a current as this. The difference between the irritability of the muscles on the one side and on the other was most striking. I never saw a more marked case. The difference which it made to the man was something very material in the matter of compensation. So you see that electricity may be sometimes used for diagnostic purposes with advantage to the patient as well as to the physician.

Now we have to consider in detail some of the diagnostic uses of electricity.

1. If the contractility of a paralysed muscle is normal, you may infer this: that it retains its normal relationship to the spinal cord; or, in other words, that the spinal cord, in the particular region at which the nerve of that muscle is given off, is not diseased; and that the nerve between the spinal cord and the muscle is not damaged. The cord may be diseased, so that its conducting power is abolished; or the brain may be diseased, so that the will is separated from the muscle that is paralysed; but that muscle, although paralysed, still maintains its normal relationship to the segment of the cord from which its nerves arise, and that segment of the cord retains its central functions.

2. If you find the contractility of the paralysed muscle to be increased, you may infer the same things, but also something more—viz., that there is present an increased irritability of either the spinal cord or brain, commonly due to some increased vascularity of one or the other of those organs. Take, for example, a case of hemorrhage into the brain. Sometimes immediately after an attack of hemorrhage, if you are rash enough to perform the experiment with electricity, you may find that the irritability of all the muscles of the body is diminished, the patient is in a state of more or less marked shock or collapse. After a little time—a few hours or two or three days—you will find no difference between the muscles of the paralysed side and the healthy side; they are just alike so far as their electric contractility is concerned. But in a few days more you may find that the muscles on the paralysed side act to a lower current than those on the healthy side—*i.e.*, that they are more irritable; and you find this change in them coincident with some headache, giddiness, heat of head, and often with a little tendency to clonic spasm or rigidity in the para-

lysed limb. In this case the increase of irritability is, I believe, due to the hyperemia that sometimes follows such cerebral accidents as hemorrhage, embolism, or the breaking down of a few nerve-fibres from softening. I do not think that electricity will help you further than this with regard to the diagnosis of cerebral disease. My own observations on this special point have led me to the conclusion that the increase of irritability of paralysed limbs in cerebral disease is not dependent on the mere locality of the disease—*i.e.*, on the simple fact that the disease is cerebral; that it is not dependent on the time that the disease has lasted; nor on the degree of paralysis present—*i.e.*, whether the muscles are completely immovable by the will or not; that it is not dependent on the extent of paralysis—*i.e.*, whether the whole limb is paralysed or only a portion of the limb; that it is not dependent on the presence or absence of sensation in the limb; and that it is not dependent on the presence or absence of spasmodic contraction in the muscles. All these may be eliminated as either necessary or constant conditions of the excess of irritability. But when the excess of irritability is present, you often find tonic or clonic contraction of the muscles, and, associated with that, a little headache or heat of head, and the other symptoms I mentioned of increased vascularity in the brain-tissue or in its membranes.

The other condition which may lead to increased irritability of a paralysed muscle is that which you meet with in some diseases of the spinal cord, such as hemorrhage, inflammation, sclerosis, or tumour. For instance, when disease is situated in the upper part of the cord, there may be complete loss of contractility in the muscles connected with that part, but an augmented irritability in the muscles lower down. Myelitis, or a tumour pressing upon the cord above, may set up a certain amount of irritation, or increased vascularity in the cord or its membranes below, and this leads to an increase in the electric irritability in those muscles connected with the lower portion of the cord. At the same time, you often meet with spasmodic movements, an increase of reflex irritability on tickling the soles of the feet, and an increased contractility on percussion. This condition is not permanent, for usually disease extends downwards, and the contractility eventually becomes impaired.

Sometimes the muscles which have ceased to respond to faradisation exhibit energetic contraction when galvanised. To this condition I shall recur immediately. The electric contractility of muscles is sometimes found to be increased when there is no paralysis in the strict sense of the word; but when there is some weakness associated with, and apparently dependent upon, pain. In the early period of so-called "locomotor ataxy" there is often an exaggeration of electric contractility, and a similar condition

may be observed at the commencement of paralysis agitans. In hysterical paralysis, also, the irritability may be either normal or increased.

3. We now come to the consideration of those cases in which the electric contractility is diminished. Several conditions may lead to this diminution. The brain may be diseased, or damaged in such a way that paralysis shall occur, and that eventually the contractility of the muscles shall be diminished. There may be disease in the spinal cord which shall lead to this change very rapidly,—there may be disease in the nerve which shall induce it almost immediately,—the muscle may be in an altered state of nutrition,—or, lastly, the blood of the patient may be altered by some toxic agent, so that the electric irritability of nerve-centres, nerves, and muscles is reduced. Electricity may, to a certain extent, help you in distinguishing between these several conditions.

(a) When you find, as the result of cerebral hemorrhage, softening, or tumour, that the irritability of the muscles is diminished, the usual explanation is this: that the muscle has lost the whole or part of its irritability from disuse, which may or may not be accompanied by wasting. When this is the case, a few applications of electricity, repeated at tolerably short intervals, will put the muscles into precisely the same state as the muscles on the healthy side, so far as electric irritability is concerned. You bring them into action, and you improve their nutrition. After two or three applications of galvanism or faradisation—it does not matter which,—the muscles will flicker about as readily as those on the opposite side; but you may go on till doomsday in these cases and not produce the smallest improvement in the paralysis: the muscle does not resume its relation to the will. You simply recall the electric irritability which was in abeyance from disuse. When you cease your applications, you find the patient can move his arm no better; and in a few weeks the muscle again is wasted a little from disuse, and has become somewhat diminished in its electric irritability. When you find that, after several applications of electricity to the limbs that have been paralysed by cerebral disease, there is no restoration of the contractility of muscles, you are warranted in inferring that disease has extended downwards to the spinal cord.

(b) When the cord itself is diseased, and there is loss of electric contractility, you may find precisely the same relations to disuse; but you may find, in other cases, that there is loss of power and diminution of electric irritability, which are not due to simple inaction, but to true "spinal paralysis." In these latter cases a few applications of electricity effect no change; but if you go on systematically with galvanism, and attend to the

general health, you may, after many months of treatment, find that there is some improvement, or even a cure. It is probable that, in these cases, the stimulation of the peripheral ends of the muscular nerves may have some reflex influence on the nutrition of the cord, and may assist in the general process of repair; but when the cord is disorganised, and the paralysis and loss of electric contractility are complete, you can do no good by continued applications. By electricity, therefore, you may speedily decide as to how much of the paralysis is due to disuse; and you may distinguish merely impaired nutrition from actual disorganisation of the spinal cord.

(c) The third condition of diminished contractility that I spoke of is, that in which the nerve is damaged between the cord and the muscle from injury, wound, or disease. The most common form in which this direct injury to a nerve is seen is in the case of "facial paralysis," arising from disease set up in the ear, or in its neighbourhood. You there get the features of true "spinal paralysis" of the muscles supplied by that nerve, just as well marked as if you had divided a nerve in the arm, and had produced paralysis of the hand. You find a loss of electric contractility, or a diminution, in direct proportion to the amount of damage done. If the nerve be pressed upon slightly, there will be a certain amount of power left in the muscle, and there will be a certain amount of contractility retained; but if the nerve be cut across, or so far injured or pressed upon that the will cannot influence the muscles, no trace of electric contractility remains. This loss of electric contractility occurs within a few hours after a sudden lesion, but it is gradual in the cases of disease where the interruption of voluntary power is slowly induced. The loss may be partial or complete, and then you get a partial or complete loss of electric contractility—a loss which you cannot restore. You may apply galvanism time after time, but you cannot restore to the muscle the irritability that it has lost, when that loss depends on division of or irremediable damage to, the nerve. But in certain complex cases, and almost all cases are complex, you may do some good by electricity. For example, a person may have had some disease in the temporal bone, and may have been paralysed on one side of his face, almost completely. You apply electricity to it, and you find perhaps that there is the slightest flicker of contractility about the muscles of the eyelid and the angle of the mouth. Under such circumstances, continuing the application, you may find that the condition is improved up to a certain point. The eye, which was wide open, is more closely approximated by the lower lid, and there is less irritation from dust; but you do not cure the case, and you often find that further applications of electricity do no good. Here, I take it, the condition is analogous

to that which I described just now as depending on cerebral or spinal disease. The muscle has become weakened from disuse; it has not altogether lost its function, but it has lost it in great measure. From the shock of the accident, or from disease, it may have been placed at once beyond the power of the will, and its subsequent disuse has brought about changes in its nutrition. The paralysis would be permanent if the case were left to itself; but you may remove all that was due to disuse, and so, by electricity, sometimes place a patient in much pleasanter circumstances than those he was in before. A few applications of electricity will enable you to decide this question—how much of the paralysis is due to disease, and how much to disuse? I remember a man, paralysed on one side of his face for seven years before I saw him, in consequence of disease in the external ear and parotid gland, which had been set up when he was in Australia. His mouth was excessively deformed. The eye on the same side was always wide open, and he had to wear a big glass to conceal the deformity, and also to protect the eye. A few applications of faradisation brought the edge of the lower lid just into contact with the eyeball, but he was never able to close the eye. Another thing which faradisation enabled him to do was to whistle—an accomplishment which, by his paralysis, he had lost; and as he was going out into the wilds of Australia again, it was, as he said, a great luxury for him to be able to whistle when alone. He was, I think, more grateful for the restoration of his whistling power than even for having the dust kept out of his eye!

(*d*) Sometimes the loss of electric contractility is due to a change in the muscular tissue which may occur primarily: for example, there are cases of wasting and paralysis due to simple exposure to cold, such as certain examples of facial paralysis, some cases of so-called "essential paralysis" in children or adults, and also muscular palsy, the result of blood-poisoning. Cases of "essential paralysis" in the child may, I think, be split up into two great groups. There is one which depends upon spinal disease—of which I am not, at this moment, going to speak to you,—but there is another, to which I wish you to direct your attention for a few moments, which comes on from exposure to cold: as, for example, when a child sits down on a cold doorstep, gets cold, and you find one of its lower limbs paralysed. A similar accident happens when a man sits in a railway carriage, and the wind blows upon his face, and one side of his face becomes paralysed; or when he lies under a hedge, and sleeps there all night, and in the morning finds that one of his arms—that one which lay upon the wet grass—is paralysed. In these cases you find that a group of muscles is affected in a particular locality, and often

that this paralysis bears no relation to any particular nerve or branch of nerve; the lower part of a limb may be paralysed, and not the upper, or *vice versâ*; the middle part of a limb may be paralysed, and the rest may escape. You often get some paralysis of the glutei and the muscles of the thigh, while the muscles of the foot are all left intact. You may sometimes find that the deltoid is paralysed, and that there is loss of power of moving the arm backwards and forwards, or inwards and outwards, and yet that the hand retains its power. You may find that the muscles about the elbow are paralysed, while those of the shoulder and of the hand are unaffected; and in all these cases there is loss or diminution of electric contractility. I do not believe that paralysis of this distribution ever occurs as the result of central disease of the nervous system. In central disease the distribution of paralysis is such that the disease shows itself the most distinctly in the extremities—*i.e.*, at the distal ends of limbs; you find numbness at the tips of the fingers, and not over the shoulder; loss of power in the fingers, and not in the deltoid. Further, when the whole of a limb is paralysed from central disease, the order of improvement is definite: for example, in the upper extremity, the first place in which power returns is in the shoulder, then in the arm, and then in the hand. In this muscular paralysis, which may come on from some change in the nutrition of the muscle itself, you find an irregular distribution of the paralysis, and an irregularity in the order of cure. The loss of electric irritability is also irregular, and this may aid you in diagnosis. In these cases, when the muscles are primarily affected so as to produce paralysis, the curious condition may often be noticed, that the irritability to a slowly interrupted galvanic current is sometimes distinctly increased; it is greater than that which you find in a healthy limb. But you will find that if you interrupt that current rapidly, the contraction is very much less than that of the healthy limb; and if you take a faradisation machine, you may find that the irritability is completely extinct; the muscles, in this state, will not respond in the smallest degree, even to a very high power. In facial paralysis from exposure to cold, in the paralysis from lead, in that of the limbs arising from cold, and also in some anomalous cases of atrophic paralysis of limbs, the precise nature of which I do not think we can state at the present moment,—in all these this peculiar relationship may be noticed. Observe, again, what it is. To faradisation the muscles act not at all, or much more feebly than they should do. The rapidly interrupted galvanic current exhibits precisely the same thing; but if you very slowly interrupt the galvanic current, they exhibit a greater amount of irritability than do the healthy muscles. The first of these positions was made out

by several observers at about the same time; but the second—that with regard to the rapid interruption of the battery current—was what we have observed in this hospital. You can immediately alter the relation of the muscle to the galvanic current by a more rapid interruption; galvanism then produces no effect at all, although it will act perfectly on those muscles of the patient which are not paralysed, and, as many of you have seen, upon your own. This form of disease seems to place the muscles in precisely the same relationship to the rapidly intermitted galvanic current as to faradisation; but the fact which I do not think has yet received an explanation is this: that the muscles, in this curious condition, are over-sensitive to the galvanic current when it is interrupted slowly. The explanation may be difficult; but the fact is clear enough. When the irritability of a muscle is diminished to galvanisation as well as to faradisation, you have some disease present which is different from that I am describing. You will find such cases very difficult to cure; whereas, in the treatment of the former class, the application of slowly interrupted galvanism is rapidly and notably useful, and displays an interesting physiological fact—viz., the gradual reduction of the over-sensitiveness of the muscle to that slowly interrupted galvanisation, and the gradual return of contractility to faradisation and rapidly interrupted galvanism. To-day, for example, the muscles will act to five cells of Elliott's battery, and will not respond to a strong current from Stöhrer's; but next week you will find that you require ten or fifteen of the former to produce any result, and that a much lower degree of the latter will induce some flickering contraction. You go on for another week, and you have to employ a still larger number of cells to produce the same result, and at last you find the muscle in the same condition as the healthy one; and then you find that it has regained its ordinary state to faradisation. This has been seen so often, in cases of lead paralysis as well as in those which are due to cold, that there is no doubt about the fact, whatever may be its explanation; the over-sensitiveness to the battery current is gradually reduced by the application of that current, and the loss of sensitiveness to faradisation is gradually brought back as you employ slowly interrupted galvanisation.

(*e*) Lastly, the electric contractility is diminished by certain changes in the blood—such as anæmia, chlorosis, and opium poisoning. Here the diminution is moderate in degree, but general in its distribution, is little or not at all influenced by electric applications, and is removed only by the improvement of the general health or the elimination of the poison.—*Lancet*, *April* 16 *and* 23, 1870, *pp.* 539, 575.

DISEASES OF THE ORGANS OF CIRCULATION.

20.—ON THE HYPODERMIC USE OF MORPHIA IN DISEASES OF THE HEART AND GREAT VESSELS.

By Dr. T. CLIFFORD ALLBUTT, M.A., Cantab., F.L.S., Physician to the Leeds Infirmary, &c.

[The use of opium by the mouth has always been avoided in heart cases, in which, perhaps, as much as in any class of diseases, relief from suffering and sleep at night are demanded. Dr. Allbutt points out that, as the action of morphia given subcutaneously is quite different from that of the same drug administered in the usual way, we must give up our old ideas as to the danger likely to result from increased venous congestion.]

From small and timid beginnings I have gone forward with this marvellous remedy, until I find myself now justified in using it fearlessly in any form and in any stage of heart and aortic disease. No matter how swollen the limbs, no matter how agitated the pulse, no matter how blue and how turgid the face and lips, I now never hesitate to inject morphia, and scarcely ever fail, even up to the time of the dying agonies, to give relief decided enough to earn the warm gratitude of the patient. At such times one feels the blessing of being a physician.

I use the hydrochlorate of morphia in doses varying from one-tenth to one-third of a grain; I seldom use half a grain, except in such a case as intense pain from angina or intra-thoracic tumour. I always begin with one-eighth or one-sixth; and in ordinary cases I find a quarter of a grain the proper dose—in a case, say, of mitral regurgitation with pulmonary congestion in an otherwise healthy adult. The dose is best given in an evening, and should always be followed by perfect quiet in the room. This last is an important element in all cases of injection of morphia. The urine should be examined, and the drug withheld or given with caution if albumen be found. I think, however, there need be no great fear of it during albuminuria only secondary to the heart disease, unless there be reason to suppose that excessive renal congestion be present, and head symptoms at hand.

Once or twice I have injected morphia in small doses to mitigate suffering in patients with heart disease associated with granular kidney, and in whom no head symptoms had appeared. I have done it, however, in fear and trembling, and I think the risk is better avoided.

It is surprising how little the morphia has affected the head in the multitudes of cases in which I have tried it. The condition of the brain in heart disease is often, no doubt, anæmic, and some of the restlessness of the patient, and some of the heart disorder, may at times be due to cerebral anæmia. In such cases one might expect the morphia to calm by bringing about the sleep, or rather the stupor, of cerebral congestion;—but this explanation is insufficient. On the contrary, in aortic disease with marked symptoms of encephalic anæmia I have seen less good result from the hypodermic use of morphia than in heart cases of other kinds. But in cases of mitral regurgitation, when the head is full of venous blood, and distress and stupor seem striving together, then I have found great benefit from the injection, for it stills the distress in the chest, and by staying the tumult of the heart it seems to allow the sinuses to empty themselves, and to allow of the establishment of a true soporific anæmia. I think, moreover, that the unwonted blessing of peace brought by the drug so tranquillizes the system, that even those persons find solace and rest from its use, when labouring under heart disease, in whom, under other circumstances, morphia would rather annoy the medulla than tranquillize the cerebrum. I scarcely ever remember that morphia caused disturbance of the stomach or other inconvenience in the cases I am describing. As in cases of severe pain, so it seems that in cardiac disturbance the intolerable distress "carries off" the troublesome qualities of the drug. Its effects, again, are not merely comforting, but are curative so far as such cases are to be cured. An injection of morphia three or four times a week, by tranquillizing the heart and allowing the circulation to recover its freedom, sets free also the organs which are oppressed, and the system can once more find something like its balance. Thus relieved, the patient may with incessant care enjoy some respite from his malady, and the occasional use of morphia may put off the day of its return. All this bears very closely on the difficult question, How is it that a man having a given lesion of the heart goes on sometimes for a year or two without an "attack" of general suffering, and after recovering from this may again go on for a longer or shorter while before the "attack" is repeated, the heart lesion remaining always the same? There seems to be a gradual accumulation of deficient work, which does not throw the patient over until it reaches a certain amount. Gradually and indirectly the morphia injection does much to restore balance of function; directly and immediately it seems to affect the chest almost alone. The face generally becomes less turgid and its expression calmer. The heart, which for days had been thumping out of all rhythm, or striving against an unequal weight of blood, becomes tranquil

and rhythmical; and this, whether it be a direct result of the morphia or not, is the chief one, and that upon which the rest seems to hang. More haste, worse speed, is as true of heart work as of any other, and it seems clear that the hurried labour of the overtasked heart is not compensatory, but is mere blindness and bewilderment. After injection the insufferable precordial distress ceases, and the heart gaining time and rhythm gains power. The effect upon the pulmonary circulation is very striking, the congestion and secretion of the lungs being lessened, to the unspeakable solace of the patient.* The quick, shallow, anxious "cardiac dyspnœa" gives way to a deeper, slower, and easier movement; the cough falls, not from want of sensibility, but from relief of oppression; the overweight of blood oozes slowly onwards, and the patient, who has been tossing in misery, feels the first tranquil sleep he has enjoyed for weeks. On awaking he is conscious of an ease he has not felt for long, and the good effects are often as well marked, and sometimes better marked, the second night than the first, so that in ordinary cases an injection every alternate night is sufficient. The injection has little or no direct effect upon the anasarca or the urinary secretion, but only gives occasion for their relief by other means. The venæ cavæ are no doubt unloaded, but the state of the kidneys and legs is too confirmed for immediate change.

As regards the class of cases in which the morphia is useful: it gives the most striking relief in angina with diseased coronary arteries, &c., in neuralgic distress from intrathoracic tumour, and in mitral regurgitation. It is very valuable also in small doses in so-called "irritable heart," whether this be due to weakness of the organ or instability of its nerves. It is less useful in disease of the aortic valves, and I think it is less valuable in mitral obstruction than in mitral regurgitation. In aortic disease however, where the heart is big and pumping, it gives much ease.—*Practitioner, Dec.* 1870, *p.* 342.

DISEASES OF THE ORGANS OF RESPIRATION.

21—ON BRONCHITIC ASTHMA.

By Dr. HYDE SALTER, F.R.S., Physician to Charing-Cross Hospital.

[A pure case of asthma is one in which, if the spasm is relieved all symptoms of dyspnœa are gone. This is not the form of the

* It is the administration of "an opiate" during the clogged state of the lungs which will excite the most serious doubt. We cannot, however, reason in the least from morphia by the mouth to morphia by the skin; the remedies are quite distinct in their results. I have never dared to inject morphia in bronchitis, but shall not wonder if it is done before long.

disease however which is most common, and must be distinguished from bronchitic asthma.]

The diagnosis of any case of asthma involves two things, first, the determination whether the case is one of asthma or not; and, secondly, if it is asthma, what particular variety of the disease it is. With the view to treatment, it is not enough for you to determine that the symptoms are those of asthma; when you have determined that, you have only half done your work: you might be perfectly correct so far, and yet your treatment might be altogether wrong. The radical treatment of asthma depends far more upon what variety it is than upon the mere fact that it *is* asthma, and for this reason—that the radical treatment is the treatment of the cause, and the cause determines the variety. Until, therefore, you know the variety of the disease in the case you are dealing with—in other words, until you know what cause or causes lie at the root of it,—you cannot hope to treat it successfully or conclusively. You may work away at the asthma as long as you like; but as long as you are merely treating the asthma, you are merely treating a symptom, and your treatment will be only palliative. Suppose, for instance, I have a case of bronchitic asthma; I shall never see the end of the asthma till the bronchitis is subdued which excites it and keeps it up. Or suppose I have a case of peptic asthma, I shall never see the end of the asthma till the dyspepsia is removed, or the patient put on such dietetic rules as will enable him to steer clear of all offence in the direction of the stomach. Of no two diseases is the treatment more different than of these two varieties of asthma. In relation to therapeutics they are as wide asunder as the poles. The mere palliative treatment, no doubt —the immediate treatment of the asthmatic dyspnœa,—would be the same in both; but in their radical treatment they have nothing in common.

How, then, shall we determine in any given case of dyspnœa—whether, in the first place, true asthma is present? and, in the second, if present, whether it is of the bronchitic variety?

It is, no doubt, a difficult thing to give a concise and simple definition of the essential constituent evidences of asthma— such a definition as it shall be impossible to quarrel with, contained in half a dozen words, yet inclusive of all that is essential, and containing nothing that is nonessential. But I think if we say that asthma is "paroxysmal dyspnœa, accompanied by sibilation," we shall be pretty near the truth. If we go beyond this, we pass from a definition to a description, and shall have to increase our preciseness by a series of qualifications and negations. The only direction in which I think such a definition could possibly be imperfect would be in the direction of bronchitis. It would exclude cardiac dyspnœa, for that is not accompanied by

sibilation; it would exclude the dyspnœa of emphysema, for that is neither sibilant nor paroxysmal. But would it exclude the dyspnœa of pure bronchitis? I think it would; for I do not think the dyspnœa of bronchitis can ever be called truly paroxysmal. No doubt it is worse at one time than another; no doubt in every severe attack of bronchitis there is a period at which the dyspnœa is at its height; no doubt exertion may at any time aggravate it. But I do not think it can be called truly paroxysmal. We should render our definition much more complete in this direction if we could add to the word "paroxysmal" the word "recurrent" or "periodic." But this we cannot do; for asthma may occur once and only once, and then the paroxysm is not recurrent: it may also be entirely free from any trace of periodicity. Let us be content, then, with our definition, and conclude that whenever we have "dyspnœa truly paroxysmal, attended by sibilation," whatever else is present, asthma is present. And now for the second question—Whether asthma, if present, is of the bronchitic variety.

There are three circumstances on which I am in the habit of depending for the determination of this point, and I think almost any one of the three would be sufficient for its settlement; certainly the three united would be absolutely conclusive. The first is, whether the asthma is a winter asthma; the second, whether causes of catarrh are the causes of the attacks; and the third, whether the expectoration is purulent or not. If these three questions are answered in the affirmative, there is no doubt whatever that the asthma is bronchitic; and it necessarily almost invariably happens that when one of them is affirmatively answered the other two are also. The restriction of asthma to winter points to its bronchitic nature, because the agencies at work in winter—depression of temperature, humidity, sudden changes—are amongst the commonest causes of bronchitis. Its production by the causes of catarrh points to its bronchitic nature on exactly the same principle; while the purulent character of the expectoration derives its diagnostic value from the fact that pus is never thrown off by a mucous membrane unless that membrane is hyperæmic. In asthma unassociated with bronchial inflammation I believe the expectoration is never purulent.

If, then, I find a case in which dyspnœa is the prominent symptom, in which that dyspnœa is strictly paroxysmal, in which it is accompanied by musical râles, in which there is a winter periodicity, in which the causes of the attacks are chiefly those of catarrh, and in which the expectoration is purulent, I come to the conclusion that I am dealing with a case of bronchitic asthma.—*Lancet, Jan.* 29, 1870, *p.* 147.

22.—THE CHIEF CAUSES OF HOARSENESS AND APHONIA, WITH HINTS ON TREATMENT.

By Dr. GEORGE JOHNSON, Professor of Medicine in King's College, and Physician to King's College Hospital.

There are cases of purely nervous or functional, or, as they are sometimes called, hysterical aphonia. The voice may be reduced to a whisper, and even that is sometimes inaudible. On looking into the larynx, we see no evidence of structural change, but when the patient attempts to vocalise we find that the vocal cords remain motionless, or that they move very little. This nervous aphonia often comes on suddenly, and it often passes away as suddenly as it came. The best treatment for it consists in the application of electricity directly to the larynx by means of Dr. Morell Mackenzie's "laryngeal galvaniser." The shock excites spasm and a scream, and the cure is sometimes very rapid. I have cured several of these cases at a single sitting, and one by a single shock of electricity. A boy, about 12 years of age, was much frightened, and nearly drowned, by falling into a pond. From that time he completely lost his voice, his intellect being unimpaired. When I saw him he had not uttered an audible sound for two years. I saw that his larynx was healthy, and I determined to apply electricity. The first shock elicited a loud scream, and at once he recovered his speech.

In most cases it is necessary to apply the electricity again and again before the cure is complete, and in some cases the treatment is unsuccessful, but these are comparatively rare. When the general health is impaired, treatment should be directed to remedy this while the electricity is being employed.

It is remarkable, but quite intelligible, that when, from any cause—a growth upon one of the vocal cords, or inaction of the muscles—the glottis remains partly open during vocalisation, the air escapes so rapidly during the expiratory act of speaking, that the patient is often compelled to draw in a fresh breath before he comes to the end of a sentence. In consequence of the patulous state of the glottis, there is a rapid escape and waste of air, and the chest is soon emptied.

There is a form of aphonia or weakness of voice which I look upon as the result of muscular fatigue and weakness. I have seen a considerable number of these cases, and most of the patients have been clergymen. The patient begins to speak in a clear and loud voice, and he continues to do so for a variable time; but after speaking or reading aloud for, it may be, a quarter or half an hour, the voice becomes feeble, and it may soon be reduced to a whisper. At the same time there is a feeling of fatigue, and sometimes positive pain in the throat.

With these symptoms we may find, on looking into the larynx, no trace of structural change, or only slight congestion and redness without swelling. A common cause of this form of dysphonia is overwork of the larynx, from frequent preaching and reading in large churches. I have known it to result from over-exercise of the voice in singing, from straining of the voice by the habit of loud talking in the midst of noisy machinery, and from violent efforts in giving the word of command.

In some instances this peculiar form of laryngeal weakness has followed upon an inflammatory attack. It seems probable that inflammation may sometimes extend from the mucous membrane to the muscular structures beneath, and thus the nutrition and the tone of the muscles may be impaired. This is the more likely to happen if the larynx be much exercised in speaking or singing during an attack of catarrhal inflammation.

The best treatment for these cases consists in rest for the larynx as the organ of speech, change of air and scene, and a general tonic regimen. The daily application to the larynx of a saturated solution of tannin in glycerine often does good. Tannin lozenges, too, may help to give tone to the feeble voice, and the combination of iron with small doses of strychnia is sometimes useful. I have tried galvanism, but I have hitherto seen no benefit from its use in this class of cases.—*Medical Times and Gazette, Jan.* 15, 1870, *p.* 61.

23.—THE CAUSES AND TREATMENT OF CYNANCHE TONSILLARIS.

By Dr. F. P. ATKINSON, late Surgeon St. Bartholmew's Hospital, Chatham, and Royal South London Dispensary.

[The sum of the whole matter with regard to the treatment of quinsy is, that nothing is of much use, and that cases generally do as well if allowed to run a natural course. Dr. Atkinson having suffered several times from quinsy, had his attention especially directed to the subject, and he states that his cases are generally comparatively well on the third day.]

The predisposing causes of quinsy are—want of tone about the system generally, owing to excess of mental or bodily exertion or long-continued fasts, chronic dyspepsia, imbibition of alcohol before going into the cold night-air (congesting as it does the mucous membrane of the throat and stomach). The exciting cause is cold producing suppression of perspiration. The materies morbi here selects the tonsil, the same as it does, in gout, the great toe. I do not at all hold with it being the result of cold acting directly on the throat, for then laryngitis would be a much more common accompaniment than it now is;

besides, in my own case, I noticed that the attacks came on most frequently when I took most care in wrapping up my throat; while exposure to night-air, and want of precautions, seldom seemed to produce an injurious effect. Moreover it appeared, however careless I might be directly after one attack had passed off, though in a weakened condition, a second never followed.

The treatment I prescribe is the following:—Bicarbonate of potash, one scruple; powdered guaiacum, ten grains, or tincture of guaiacum, half a drachm; mucilage, as required; water to the ounce. To be taken with fifteen grains of citric acid three times a day, in a state of effervescence. A gargle consisting of twenty minims of tincture of iodine to the ounce of water (to be used by being held in the mouth and the head shaken from side to side). Three or four glasses of port wine daily, and plenty of beef-tea. If the weather is fine, I order my patient to take a little gentle exercise in the open air. No other application is required for the throat than that mentioned. Purgatives I do not consider necessary, since as soon as the disease is over the bowels regain their proper tone, and become perfectly regular.

The advantage of the above line of treatment may be shown by relating the two following cases. While on a visit to a friend some two years ago, I was asked by a gentleman to see his brother, who was suffering from a bad attack of quinsy. I found him in bed with poultices and flannels round his throat, looking the very picture of wretchedness. He could neither speak nor swallow without great difficulty. I ordered him to get up at once, to throw off all wraps from his throat, and take gentle exercise in the open air. The medicine prescribed was the same as mentioned above. On the second day he was able to go off to his office, feeling comparatively well. A day or two after this a gentleman next door to where I was staying was taken with the same thing. He was kept to his bedroom; had mustard and linseed-meal applied to his throat; in fact, I may say, went through the usual line of treatment, and the result was that he was ill for more than a week.

Persons who have had quinsy before, which has usually run on to suppuration, are perfectly incredulous when I tell them they will be well in three days; but results almost always prove the correctness of my statement.

Of course where suppuration has commenced (as shown by the pain in the ear), the treatment is utterly unavailing, and I then stop all medicines, and simply administer wine and beef-tea.

I have tried almost every kind of treatment upon myself, both general and local, and I can say most positively that this

will be found the best. I do not really think I am stating too much when I say that it is almost a specific. At any rate I shall be quite willing to leave it for my professional brethren to disprove or endorse the opinion held.—*Practitioner*, *Feb.* 1870, *p.* 90.

24.—THE MORBID ANATOMY OF CROUP.

By Dr. GEORGE JOHNSON, Physician to King's College Hospital.

I have gradually arrived at the conclusion that English writers on croup have confounded two very different diseases. They describe croup as an inflammatory non-contagious disease, resulting usually from exposure to cold, more common in northern latitudes and in cold seasons than in the south and in the summer, and apt to recur year after year in the same subject, although usually in a milder form. The disease is to be treated by warm baths, warm fomentation to the throat, steam inhalation, and nauseating doses of ipecacuanha or antimony. Some authors advise mercury to be given. If the disease prove fatal, false membranes are described as occurring in the larynx, and often extending into the trachea and bronchi. In this account we have the history, the symptoms, and the treatment of acute catarrhal laryngitis; but the morbid anatomy is that of diphtheria, a disease which has an entirely different history. The first English writer who described the false membranes as the distinctive feature of croup was Dr. Home, whose pamphlet "On the Nature, Cause, and Cure, of Croup" was published in 1765. He gives a brief history of the first two cases in which he observed this striking anatomical change. The first case was that of a boy, aged 7, who died after a few days' illness with symptoms of croup. Four days after the death of the boy, his sister, aged 5, was seized with similar symptoms, and died suffocated on the third day. In both cases, false membranes were found in the larynx and trachea. The fact of two cases occurring in quick succession in the same family would alone render it probable that the disease was diphtheria, and not inflammatory croup. The probability is still further increased by the fact that in the second case the tonsils were swollen and covered with mucus, and there was some difficulty in swallowing. From that time to this there has been a tradition amongst English writers that an exudation of false membrane is the usual result of inflammatory croup in children. Bretonneau refers to Dr. Home's cases of croup as examples of "malignant angina," which is one of his synonyms for diphtheria. (*Memoirs on Diphtheria*, New Sydenham Society, p. 107.)

Dr. Cheyne's work "On the Pathology of the Membrane of Larynx and Bronchi," published in 1809, has been a great

authority on the subject of croup. That he met with cases of diphtheria is evident, from his statement that he had seen several children whom he would have supposed to be suffering from the second stage of croup, but in whom, upon examination, he discovered what he calls "sloughs on the tonsils and uvula." The children died; and, although the bodies were not examined, he expressed his belief that, since the cough, voice, and breathing were those of the second stage of croup, "the larynx would have been found lined as the fauces were."

It is only during the last few years that diphtheria has been recognised amongst English practitioners as a distinct specific, infectious and sometimes epidemic, disease. Meanwhile, the French pathologists Bretonneau, Trousseau, &c., have given a complete history of diphtheria. Croup they describe as a disease characterised by an exudation of false membrane, forming a part of the history of diphtheria, and quite distinct from catarrhal laryngitis, which Bretonneau calls "stridulous angina" and "tracheitis," and Guersant designates "stridulous laryngitis, or false croup." There is here no question of laryngismus stridulus, or spasmodic croup. (See the *Memoirs on Diphtheria.*) Guersant remarks that the cough is loud and sonorous in cases of stridulous laryngitis; while in membranous laryngitis or diphtheria it is hoarse and stifled by the exudation. The voice, too, in this latter affection is not simply hoarse, but almost suppressed.

My attention was first specially directed to this subject by finding no false membranes in the air-passages after death from acute catarrhal laryngitis in children. Mr. Porter, in his book on the *Larynx*, mentions three cases of fatal croup without false membranes in children, aged respectively 5, 4½, and 2½ years. Sir Thomas Watson says "there are a few cases in which this adventitious membrane is not formed at all; the inner surface of the windpipe is seen to be merely reddened and tumid, and covered with viscid mucus; or, perhaps, with a shred or two of concrete albumen here and there." Then I have occasionally met with cases of supposed inflammatory croup in which I found during life diphtheritic exudation on the tonsils, soft palate, or pharynx. With these appearances were associated other indications of the true nature of the disease; perhaps evidence of infection, discharge from the nostrils, swelling of the glands under the jaw, albumen in the urine. In some cases, the evidence is less complete. Most writers on diphtheria describe cases (and I have seen some) in which there is either no exudation visible on the fauces, or there is a scanty secretion, which soon disappears while the exudation within the air-passages increases and destroys life. And, again, there are other cases in which the diphtheritic exudation begins in the air-passages, and never

extends to the fauces. In such cases, the diagnosis may sometimes be difficult. (See Trousseau's *Clinical Medicine*, vol. ii, p. 486-7, New Sydenham Society.)

Our present knowledge of this subject warrants us, I think, in stating positively that two distinct diseases have been confounded under the name of croup by many English writers. 1. Acute catarrhal laryngitis. This, in children, is inflammatory croup; and, whether it occur in children or in adults, the only structural change in the larynx and trachea after death is congestion and swelling; sometimes superficial abrasion of the mucous membrane, with mucous or puriform exudation on the surface, but no tenacious false membrane. 2. Diphtheritic croup, which, whether it occurs in the child or in the adult, is attended with the formation of a more or less abundant and tenacious false membrane in the air-passages. The exudation of false membrane depends, not upon the age of the patient or the intensity of the inflammation, but upon the specific character of the disease; so that the presence of the false membrane after death would suffice, in a doubtful case, to determine the nature of the malady.

One circumstance that has helped to perpetuate error with regard to the morbid anatomy of croup has been the fact that inflammatory croup is a far less fatal disease than diphtheritic croup. Most cases of the former recover when early and judiciously treated, while of the latter by far the greater number die. Therefore, after death with croupy symptoms, false membranes are more frequently present than absent. Both Home and Cheyne report several cases of recovery which were nearly certainly cases of simple laryngitis or inflammatory croup.

The practical importance of distinguishing acute catarrhal laryngitis or inflammatory croup from diphtheritic disease of the air-passages is manifest, when we consider that the treatment which usually puts a stop to the former disease is unsuitable, and even injurious in cases of diphtheria, a disease which requires an entirely different method of treatment, and in which local remedies are especially valuable.—*British Medical Journal, Jan.* 1, 1870, *p.* 4.

25.—THE LOCAL TREATMENT OF CROUP.

By M. ADOLPH WEBER.

A knowledge of the power possessed by lactic acid to dissolve fibrinous exudations induced the author to try it in cases of croup. At first he used it only after the operation of tracheotomy, partly with a view to keep the tracheotomy tubes clean, and partly hoping that the lactic acid might affect the membranes which extended downwards into the bronchi. The

results were so favourable in both respects that he proceeded to try it in severe cases of croup before having recourse to tracheotomy. Since then he has not once had occasion to operate, and has not lost a single case of croup. In some very severe cases in which inspiration and expiration were equally obstructed, and the conditions of the fauces indicated an abundant fibrinous exudation in the trachea, the difficulty of breathing was completely relieved within seven to ten hours of using this remedy, and two or three days after no trace of the local affection remained.

During the treatment there was not, as is generally the case, an expectoration of tough membranous sputa, but gradually the whistling barking inspiration and expiration were replaced by distinct rattling noises; the voice, before quite suppressed, began to assume a hoarse timbre, and considerable quantities of loose white frothy phlegm were expectorated during the fits of coughing, until at last the struggle for breath quite ceased, and the disease assumed more the character of a catarrhal affection of the throat.

The treatment consists in the local application of the remedy to the windpipe by means of inhalation. The patient is made to inhale a solution of lactic acid (15 to 20 drops in half an ounce of water) at first every half hour, and afterwards, when the respiration improves, every hour or every two hours a solution of 10 to 15 drops in half an ounce of water.

The inhalation is discontinued as soon as the dyspnœa has subsided, and to promote expectoration camomile tea is exhibited.

In using the inhalation care must be taken that the vapour does not affect the eyes or face.

With this treatment was conjoined the internal exhibition of carbonate of soda every half-hour or every hour, which was thought to exert a beneficial effect upon the exudation.—*Medical Times and Gazette, Jan.* 22, 1870, *p.* 95.

26.—HYDRATE OF CHLORAL IN WHOOPING COUGH.

By ALEX. MAXWELL ADAMS, Esq., Surgeon 2nd Regt. Lanark Militia.

I have lately been treating severe cases of whooping-cough very successfully with small doses of the hydrate of chloral. In children of about six years old, five grains given two or three times daily, in a little syrup and water, will usually mitigate the severity of the paroxysms. As often happens, if the cough is not very distressing during the day, but increases in violence after the child is put to bed, then about six grains

given only at bedtime will in most cases ensure a comparatively quiet night. Such doses do not seem to produce drowsiness, nor any bad effect whatever. I have been using it in my own family and elsewhere; have watched its effects very closely, and am satisfied that, where the cough is unusually severe, and likely in consequence to lead to other complications, it will prove a most invaluable remedy. I have also been using the solution of the peroxide of hydrogen in this complaint, as recommended by Dr. Richardson, and find it likewise a good and safe sedative, but not nearly so efficacious in severe cases as the hydrate of chloral. In some of my cases I have been giving the solution during the day, and a dose of chloral at bedtime, with marked benefit.—*Lancet, Feb.* 5, 1870, *p.* 212.

27.—ON THE THEORY OF COUNTER-IRRITATION.

By Dr. FRANCIS E. ANSTIE, Senior Assistant Physician to Westminster Hospital.

[The indiscriminate use of blisters in such cases as pneumonia, for example, in the hope of controlling the inflammation, is not only wrong, but almost ludicrous (not for the patient).]

Who that has made acquaintance with average practice will deny that numbers of medical men still lean with blind dependence upon such remedies in such cases? They are the refuge of the destitute, the one haven that seems open in stress of dirty weather!

Let us now examine the counter-irritation theories of the orthodox, expressly excluding Dr. Ross from that respectable company. Those who accuse young medicine of wanton heresy in this matter seem to think that the old system was self-consistent, and was merely the practical working out of a principle which equally holds good under the ancient and the modern physiology. I think it is not difficult to disprove this idea. There are, in fact, two main theories which have been vaguely held at various times; now one, and then the other predominating in the minds of the adherents of counter-irritation; namely, the theories of *depletion* (in a mainly mechanical sense) and of *derivation* or *revulsion*, which was for the most part a vitalistic and ontological idea. The first of these is that adopted by Dr. J. R. Bennett in his able article, and I must confess that it appears to me to offer the only respectable defence that can be adduced for the commonest of all uses of counter-irritation: viz. the employment of a severe skin-irritation to relieve a deeper organ embarrassed with acute inflammation. It rests on the maxim, *Ubi irritatio, ibi fluxus*, and presumes that the congestion produced by irritating the skin implies the withdrawal

of so much blood from the part which is unduly engorged. Taken in this sense "counter-irritation" includes, of course, not merely blisters, turpentine stupes, mustard plasters, and other *painful* applications to the skin, but also mere hot fomentations, and all other means by which the skin can be artificially congested. I shall not stop here to scrutinize the clinical facts upon which Dr. Bennett and those who think with him rely for proof that such external remedies do reduce the congestion of deep-seated organs, and thus lessen inflammatory processes, hasten absorption, &c. That criticism must be deferred to a future paper. But granting for a moment the therapeutic fact, and granting to the full that hot fomentations, equally with blisters, have the power to produce more or less considerable skin-engorgement, I have to ask a further question:—How can you assure us that the only common property of blisters and fomentations, in virtue of which they can be supposed to relieve the congestion of distant organs, is that of congesting the skin? It is at least abundantly conceivable that the effective common property is that of stimulating the peripheral nerves and (by reflex action) the vaso-motor nerves of the distant organ. On the other hand, there exists one well-known and most powerful objection to the depletion theory, namely, the enormous difficulty of supposing that the depletive action would be exerted to any greater extent upon the inflamed organ than upon the remainder of the circulation; while, unless this were the case, it is impossible to understand how the depletion actually exerted on the organ we desire to reach could be sufficient to cause any appreciable relief from mechanical pressure. Let us try to realize the facts, approximatively. We will suppose that a pneumonic lung, in the stage of red hepatization, contains from six to eight ounces more blood than usual—surely not an extravagant hypothesis. We will assume that by the application of a blister, six inches square, we are able to at once overfill the vessels of the skin to the extent of three or four ounces, and during the ensuing twenty-four hours to extract one ounce of serum from them—assuredly a liberal computation. What follows? why, that we withdraw from the aorta and vena cava the above-named bulk of blood, scarcely any of which will come directly from the inflamed lung, the quantity of blood in which will therefore practically be only diminished in the degree of its proportion to the general mass of circulating fluid. But even this gives too flattering an estimate of the effect likely to be produced; since the paralytic dilatation of the vessels of the inflamed organ may only too probably persist, in which case one must suppose that the part would quickly re-acquire its exaggerated complement of blood under the necessary conditions of mechanical pressure within the chest.

Such are the difficulties of the depletion theory at one end of the scale, in the case, namely, where the inflamed organ is anatomically so remote that no direct relation can be traced between its vessels and those of the skin which we irritate. A precisely opposite difficulty occurs where the organ which we aim to affect is very near, and pretty closely connected (vascularly) with the skin on which we act: here we may indeed affect the inflamed organ, and that very powerfully; but how can we assure ourselves that the paralytic dilatation induced in the skin-vessels will limit itself accurately to them, and may not extend to and aggravate the condition of the deeper vessels? Doubtless we may figure to ourselves a kind of typical case, in which an irritant, acting upon skin supplied by vessels connected with the vascular network of the diseased organ, shall be just far enough from the latter, and mild enough in operation, to affect *only* the skin-vessels, converting them into dilated reservoirs into which the blood from the engorged part may overflow. And upon the depletion theory this class of cases, one would suppose, must include all the instances in which counter-irritation is useful. But it would then altogether fail to explain the asserted benefits of the treatment in pneumonia, or in affections of the ovaries, &c.

The other principal theory on which the routine use of counter-irritation has been defended is that of "superseding one morbid action by another," which Dr. Dickinson believes to be "at the bottom" of the practice. I believe that to the largest extent this has been, and still is, the case; and I regret the fact, for it is not creditable to the philosophic education of the profession. The theory really is a "relic of notions belonging to times which were antecedent to the birth of scientific physiology:" and (*pace* Dr. Bennett) I must repeat my conviction that it is still the "leading idea of counter-irritation" for very many practitioners. It is of little use to contend that the mass of practical physicians and surgeons are quite guiltless of any predilections for mystical or metaphysical methods of reasoning about medicine; the fact is, that they inherit from their predecessors a traditional language and traditional forms of thought which unconsciously fetter them to a far greater degree than they are aware of. Nay, more, I cannot help remarking that even Dr. Bennett, though he takes, on the whole, what seems to me the far more scientific standpoint of the *depletion* theory, has still a lingering tendency towards the *substitution* theory. He quotes the *metastases* of disease, in illustration of the possibility that counter-irritation may produce effects at long distances; and he makes the same strange application of Hippocrates' maxim (that when two pains occur at once, in different parts of the body, the greater will anni-

hilate the other), which was a fruitful source of confusion in the speculations of mediæval physicians. Dr. Dauvergne (with much of whose paper I am obliged to disagree) has well exposed the fallacy of applying the above maxim to the case of inflammations. "Pains," he says, "are not inflammations, nor even congestions, and to obscure or mask a thing is not to divert or to destroy it. Yes, the old man of Cos was right when he said that a stronger pain can mask a weaker, but he was talking of a phenomenon of sensation." To me it seems clear that no inference can logically be drawn from the one case to the other, except on the basis of exploded vitalistic theories, which regarded disease as a distinct and hostile entity, whose assaults upon the organism were resented by the voluntary action of a vital spirit. And surely, the whole idea of "metastasis" is nothing more than a relic of the same school of thought. Even in the case of the so-called migrations of gout, there is nothing which truly deserves the name of metastasis, for the gouty taint equally pervades the whole organism, even at the moment when its inflammatory manifestations cease at one spot and commence at another. But to apply the general principle of substitution to the artificial treatment of the numerous inflammations which depend upon fixed morbid deposits or mechanical mischief, as is constantly done, *e.g.*, in the case of pneumonia depending on heart disease, or meningitis depending on tubercle, seems to me, as it does to Dr. Dickinson, entirely unreasonable; nor do I believe that it would ever be done by one who had fairly shaken himself free of the ontological view of disease, which is still copiously represented in our medical language by such luckless phrases as "elimination," and the like.

But it is time to turn to the consideration of Dr. Ross's theory, which differs essentially in character from both of those which have been noticed. In the first place, Dr. Ross is neither consciously nor unconsciously a vitalist. He does not regard disease as an entity, to be hustled or coaxed out of the body by force or pious fraud, and he therefore naturally rejects the substitution theory. Next, he refuses to admit the depletion theory, on the double ground that the machinery of relief which it assumes is neither demonstrable nor apparently possible, and that mere depletion would not account for the clinical facts. He draws out a series of "empirical laws" which are a rough, but, as he thinks, sufficient representation of the main clinical facts; and these laws sufficiently agree with the proposition which he puts forward as a "main intermediate proposition between the theory and the practice of counter-irritation," viz. that irritation of one part of the body tends to stimulate the textures in its vicinity. Finally, he propounds the theory that counter-

irritants exert an influence, always *stimulative* and not *depressing* in *tendency*, and that this influence is exerted, for the most part, not through blood-vessels, nerves, or any special structures, but through *continuous, and also through contiguous, parenchyma*. I shall not at present revert to the discussion of Dr. Ross's empirical laws, because that subject belongs to the domain of clinical observation, and I must confine my present remarks to matters of physiological theory, reserving to a future occasion the criticism of the clinical evidence which has been adduced.

I am anxious, at present, to conclude the history of the theoretical part of the recent discussion by explaining the hypothesis put forward by myself, which is as follows :—1. It can hardly be doubted that if so-called counter-irritants are to do any good in the *early pyrexial* stages of inflammations, they must do so by the exercise of an influence which contracts the arterioles, thus heightening the arterial blood-pressure and relieving the stress on the capillaries. 2. But all experimental evidence goes to show that *strong* irritation (strong, *i.e.*, either from the virulence of the agent, or the directness with which it is applied to the suffering part) tends to produce, not contraction—or this only momentarily—but paralytic dilatation of the arterioles, and passive overfilling of the capillary web. 3. Hence it would appear that if the more powerful stimulants ever do good in the acute stages of inflammation, it can only be when they are applied at such a distance that their influence falls very gently, and much diluted, on the part aimed at. 4. It would seem probable that the effect of milder skin-*stimulants* would be equalised with those of *irritants*, on the condition that they were applied nearer to the engorged organ, or to a larger surface of the skin; in either case the *quantity* of the influence would make up for the lack of *intensity*.

As far, then, as regards the possible benefits of skin-excitation on the *early stage of acute* inflammations of distant organs and tissues, my theory considers that all these efforts are produced by a *stimulative* action on the *vessels* of the diseased part.

5. The case of *chronic* inflammations, with no or with little pyrexia, was not sufficiently dealt with in my former paper, owing to limited space. Dr. Ross has truly remarked that the tendency of modern practice is, on the whole, towards restricting the use of counter-irritation to the treatment of the chronic forms and stages of inflammation. He points out that in the pathological stage which succeeds to that of acute pyrexia and constantly increasing engorgement, the inflamed part is the scene of abundant vital movement (cell-growth, proliferation, &c.), which, however, is of a low type. It is upon this, he thinks, that the stimulating influence of counter-irritation acts

with good effect; it substitutes for this profuse but debased activity a more restrained but higher type of formative action. I now beg to say that so far as counter-irritants can do good in this stage of inflammatory diseases, my theory is identical with that of Dr. Ross as to the effect produced, the only question left open is that of the channel of the influence. On that point, as will be seen directly, I do not agree with him.

6. The case of *neuralgic* affections appears to me to throw direct light on the *modus operandi* of counter-irritants in inflammatory diseases. The remarkable utility of blisters in neuralgia is a long-established fact; but my own observations lead me to think that these remedies as frequently do harm as good, from a wrong mode of application. I have repeatedly found that blisters applied directly to the site of the pain if anything *aggravate* the suffering; but, on the other hand, if they are applied to a posterior branch of the spinal nerve-trunk from which the painful nerve issues, a reflex effect is often produced of the most beneficial character. For example, a blister applied over the *posterior* branches of the intercostal nerves is a powerful remedy for pain situated in the course of anterior branches towards the front of the chest. Were *pain* the only symptom relieved in this manner, however, the argument would be incomplete. But it happens, in some cases of inveterate neuralgia, that inflammatory affections are secondarily produced around the points of greatest pain; and these secondary inflammations are remarkably benefited by the application of blisters in such a situation that they can only act in the reflex manner above indicated. Here, then, is a case in which one can identify the path of the noxious influence, and also the path of the therapeutic influence which successfully opposes it. It appears that the functional condition of the sensory nerve-centre, which corresponds to pain at the periphery of the sensory nerve, can extend its influence to the associated vaso-motor nerve-centres, and finally issue in paralysis of vaso-motor fibres going to the vessels of the painful part. Hence local congestion, hypersecretion, or altered secretion of glands in that neighbourhood, &c. This state of things, it seems, can be remedied by a stimulant influence falling upon the sensory nerve-centre through the channel of centripetal fibres, which have no connexion with the inflamed part except through the centre, but yet have a very clear and definite connexion with it *by that route*. I cannot but think that we have here most pregnant suggestions towards a reasonable theory of counter-irritation as a remedial agent in inflammatory affections. I have never denied for an instant that the transmission of an influence from the skin to distant organs is possible; but I insist upon two things. First, that unless we can proportion the force of the skin irritation to the vital status

of the part to be acted on, we are as likely as not to produce an effect exactly opposite to what we intended; and secondly, that we ought to have some guarantee for the influence being limited in incidence to the affected part at which we aim it. And it seems probable that by reflex stimulation applied to a physiologically distant tract of skin, which is nevertheless in direct communication with the centre on which depend the vaso-motor and also (if, as seems probable, they have an independent existence) the *trophic* nerves of the affected organ, we at once secure the necessary *dilution* of the influence, and an intelligible *path for its transmission* to the diseased part, and to that alone.

7. Dr. Ross limits the beneficial action to the secondary stages of the disease; but it appears to me that whatever good may be produced at this stage through the reinforcement, or (as he would call it) alteration in type, of the tissue-force, may be equally expected in a state of mere inflammatory engorgement by appropriate stimulation of the vaso-motor system of the affected part. And as regards the channel by which the influence is to be conveyed, I have to object to Dr. Ross's theory of the transmission, through continuous and also through contiguous parenchyma, of the stimulant action, and although it is not impossible that a stimulant influence may be thus transmitted independently of the nervous system, it is most improbable that upon the common plan of merely applying irritation to a large surface of skin that happens to be *opposite* the inflamed organ, any precision of effects can be attained. If, for instance, we attack with our blister some five or six inches square of the skin covering the chest of a pneumonic patient, it is impossible for us to be sure that in attempting to produce a beneficial stimulant action on the lung beneath we shall not gratuitously involve six inches square of previously healthy costal pleura in an *inflammation*, which may be by no means trivial in its effect upon the final issue of the case. And it seems to me that this is a serious objection to the theory of Dr. Ross so far as it applies to the use of blisters or other strong irritants to the skin of the chest or the belly with a view of influencing inflammatory processes in the lung or bowel. In short, if the influence of blisters *does* "traverse the body in straight lines, like bayonet thrusts," to use Dr. Dickinson's somewhat derisive phrase, it would seem to be an uncommonly dangerous and unmanageable influence: and it is difficult to see how it could be employed with advantage in practice. Whereas, if it travels only by the paths of reflex nervous action, there is no reason to think that (unless applied on an enormous scale) it would exert any vitally depressing effect on organs so anatomically remote, and the only question would be whether it was not purely indifferent; a view to which

I on the whole incline in the case of organs so situated as the lung and the bowel are.

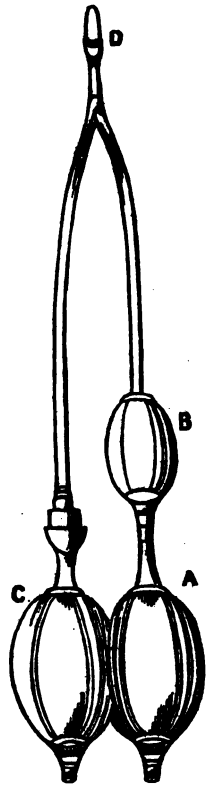
I cannot conclude this already too lengthened estimate of the present position of the theory of so-called counter-irritation without suggesting the alterations in nomenclature which seem to me to be necessitated by our improved physiological and pathological knowledge. I am decidedly of opinion that the word counter-irritation should be altogether banished from our phraseology. "Distant stimulation," or some equivalent phrase, would properly express the effects of blisters, stupes, mustard plasters, and moist heat. The actual cautery probably acts simply by *destroying* a certain quantity of sensitive tissue, and has consequently no real relationship to agents of this class. The only case in which we should retain the phrase irritant, is that in which we deliberately excite or increase inflammation, sacrificing the welfare of a comparatively unimportant tissue or organ to higher vital interests; as, *e.g.*, when we inject an irritant fluid into a serous sac, in order to promote adhesion of its walls.—*Practitioner, March* 1870, *p.* 156.

28.—ON ARTIFICIAL RESPIRATION.

By Dr. BENJAMIN W. RICHARDSON, F.R.S.

The interest taken by the Royal Humane Society to perfect artificial respiration led both directly and indirectly to the invention of easy and ready methods of carrying out the process. John Hunter was an early inventor. He constructed a double-acting pair of bellows, of which I have made a model. These, which we may call Hunter's bellows, act remarkably well; but they are clumsy, and could never be brought into use as instruments to be applied at a brief notice according to the daily wants of the practitioner. The construction is simple enough. A common pair of parlour bellows are divided in the middle of the chamber by a diaphragm of wood, so that, in fact, two distinct chambers are formed, each of which, however, communicates with one common exit tube or pipe. The upper part of one of these chambers has an opening into the air, valved in such way that when the bellows are opened the air rushes into the chamber and charges it with fresh air. The upper part of the opposite chamber has also an opening into it, but this is so valved that air can only escape from it when the bellows are being closed. The exit or common tube is, lastly, valved in such a manner that the air from the chamber which fills with common air escapes by it when the bellows are being closed, while it admits air freely into the other chamber when the bellows are being opened.

In using these bellows, the nozzle of the exit tube is placed in the nostril, and the bellows are worked in the ordinary way. Each time the bellows are expanded one of the compartments is filled with atmospheric air, the other with air derived from the cavity of the lungs. Whenever the bellows thus charged are closed, the pure atmospheric air is forced into the lung, and the impure air derived from the lung is driven into the outer atmosphere. In most of my earlier experiments I used these bellows, and with many satisfactory results. A pair of bellows similar to those invented by Hunter were afterwards brought out in France, and were called the "adnoptic bellows." They were, I believe, for a time adopted by the Humane Society. About thirty years ago Mr Read, the surgical instrument-maker in Regent-circus, Piccadilly, invented a very ingenious apparatus for artificial respiration. In principle this apparatus was similar to the bellows of Hunter, but, instead of ordinary bellows, two brass syringes were employed, from one of which air was driven into the lung, while into the other air was received from the lung, both actions being produced by a single motion of the hand. Mr. Read's apparatus was remarkable for the precision with which it worked, for, the pistons being graduated, absolute measured quantities of air could be introduced into and removed from the lung at pleasure. At a meeting of the Westminster Medical Society, the late Dr. Snow allowed his mouth and nostrils to be closed entirely so that his respiration might be sustained by the pure action of the syringe. The objection to the apparatus was its size; it could not be rendered portable for the common uses of the practitioner.



A, Feeding bulb.
B, Reserve chamber.
C, Exhausting bulb.
D, Nostril tube.

Owing possibly to the difficulty of making a portable instrument, the adoption of bellows and syringes fell into disuse. They have been supplanted in later times by the method known as the "ready method" of Dr. Marshall Hall

and by the more recent method of Dr. Sylvester. The systems of these observers are too well known to require description at length. In Dr. Marshall Hall's plan a gentle movement of the body, from the front of the chest to the side, empties and resupplies air. In Dr. Sylvester's plan a movement of the arms from and to the side fulfils the same purpose. It is to be admitted at once that by either method sufficient air is introduced into and removed from the lung to represent natural respiration perfectly, while no mechanical injury can readily be inflicted on the lung structure. Further it is to be admitted that, in cases where no other means are at command, they are excellent methods, and one or other should always be resorted to. At the same time they are both open to an objection: they interfere with the movements of the heart. I find by experiment, that is to say, and the point will be better illustrated further on, that when the heart is brought down to a very feeble action, from suspension of the respiratory power, the slightest thoracic pressure is sufficient to arrest action altogether.

Recognising this difficulty, I have myself within the last few months constructed successfully a pair of bellows which act as well as the Hunterian model, and which have this advantage, that they can be carried in the pocket, and are, in fact, as portable as need be. The bellows consist, as you will see, of two india-rubber hand bellows, which may be joined together or may be separated according to choice. I usually have them joined. The bellows terminate in one common tube, which we will call the nostril tube, and each bellows contains four cubic inches of air. The bellows are so valved that when, after being compressed together, they are allowed to expand, the one fills with common air, and the other, when the nostril tube is inserted in the nostril, is filled with air from the lung. During compression, after filling, the air in the bellows containing pure air is driven into the lung, while the air in the bellows containing impure air is expelled into the common atmosphere; one bellows is, in fact, exhausting, the other supplying. To the supply bellows is added a small bag or reservoir, very elastic; this prevents undue tension of air upon the lung. (*See Fig. p.* 91.)

In applying these bellows I proceed in the following way:—I introduce the nostril tube into one nostril, so that it shall fill the nostril completely; then I close the other nostril with a grasp of the finger and thumb, and having carefully closed the mouth, I commence to inflate. If the chest of the subject be small, as, for instance, the chest of a newborn child, I work both bellows at the same time; but if the chest be large—the chest, for instance, of an adult man—I make five consecutive strokes with the bellows which fill the lung, and then three consecutive strokes with the bellows which empty the lung. In

this way natural respiration is very carefully imitated; the lung can be filled and emptied ten times in the minute, and no danger of mechanical injury from the action is incurred.

I will now proceed to demonstrate, by one or two experiments, the best and most successful mode of applying artificial respiration. For this purpose we will subject an animal to the action of methylic ether gas, will allow it to go to sleep, and then to inhale the gas until all respiration has ceased. We will also so time the inhalation that the cessation of respiration shall occur within four minutes from the commencement of the inhalation. (The experiment was performed.) The animal has now ceased to breathe. I take then the pocket bellows and introduce the nostril tube into one nostril; next, seizing the side of the bellows which empties the lung, I make one or two strokes so as to empty the lungs of their contained air, and this done, I grasp both bellows and commence to fill and empty the lung very gently, watching the effect produced upon the chest. (The process was continued for three minutes.) In this case I have no response, and my experience tells me that I shall have none. I have either by a little haste inflicted some mechanical injury on the structure of the lung, or I waited too long before I commenced the artificial respiration, so that the right side of the heart had time to become arrested. We will therefore repeat the observation on another animal, taking care, after the respiration has ceased, to begin our efforts towards restoration of life more speedily, and be more carefully delicate in manipulation. (The experiment was repeated as proposed.) Now, the respiration having again ceased, I will, as before, first empty the lung, and then alternately empty and fill with air. (The artificial respiration was continued for about a minute and a half, when the animal recommenced to breathe naturally. The animal, you will observe, of its own volition, has made an inspiration, and now my efforts must instantly be brought to a close. I withdraw the nostril tube, and leave the animal to its fate; the result in nearly every case will be perfect recovery. (The animal in this experiment continued to breathe as in sleep for some minutes, and before the close of the lecture had recovered. In both cases a rabbit was the subject of observation.)

Reviewing this last experiment, let me particularly call your attention to two practical facts applicable to all cases where the artificial method is resorted to, whether the subject be a man or a lower animal. The first fact is, that the introduction of air, after the emptying of the chest, cannot be too gentle; the second, that so soon as the natural respiration is set up, the artificial respiration must be allowed to cease.

The demand for attention to these two details is based on the consideration of what I have elsewhere called the balance of

the respiratory and circulatory systems. I mean by this the balance of pressure between the blood impelled into the pulmonary circuit by the right side of the heart and the air drawn into the air-passages of the lung by the action of the inspiratory muscles. In health this balance is perfect, and the integrity of the vascular structure of the lung depends upon the continuance of this perfection. If we break this balance by cutting off the supply of blood through the pulmonary artery, the respiratory movements remaining in full power, the result is undue pressure, or rather unresisted pressure, of air and emphysema. If, on the other hand, we break the balance by cutting off suddenly the supply of air, the motion of the heart continuing the same, the lung is left to the unresisted pressure of blood, and the result is congestion of lung. When Hooke's famous experiment is under observation both these conditions of lung from rupture of balance can be demonstrated perfectly to the eye. When, then, from accidents leading to arrest or suspension of the respiration, the power of the heart is reduced to the lowest, when the organ all but ceases to beat, it is necessary to restore the respiration, with so much gentleness that the two systems shall be restored. Press air forcibly into the lung at this moment, and rupture of the vascular structure is a necessary consequence. The point of practice, in brief, is simply to fan the little remaining current of blood which is making its way over the pulmonary surface for aeration, and so soon as ever the muscles of the animal take on the merest action, so as to continue the process, to let them do the work without any artificial aid; they will assuredly be equal in power to the embarrassed heart, and the two powers will soon be working upwards and in harmony.

The whole meaning of artificial respiration, the whole value of it, may be truly and yet simply illustrated by the experiment of putting out and relighting a lamp. I take here the microscope-lamp, known usually as the Queen's reading lamp; I place a damper on the chimney when the light declines; I wait some seconds, and then, removing the damper, drive a little air through the chimney—and see, the flame revives. I repeat the process of nearly extinguishing the flame, and once more I give air; but this time I give the air more determinately, and the result is utter failure, so that now I have put out the lamp altogether. Childish as this experiment may be, it is one which should never be forgotten when artificial respiration is under practice; the remembrance of it tends to subdue the desire to effect more than is required.—*Medical Times and Gazette, Dec.* 4, 1869, *p.* 649.

29.—ON THE ESTABLISHMENT OF ARTIFICIAL RESPIRATION BY MEANS OF ELECTRICITY.

By the Editor of the LANCET.

[Electricity to be of use in establishing artificial respiration must be obtained from the right sources and applied in the right way. The rotatory electro-magnetic machines are not suited either for this or for any other medical purpose. They are very uncertain in their effects.]

For all medical uses, the inducing current should be quite uniform; and, for the purposes of resuscitation, the machine must be ready at a moment's notice. These two conditions are best fulfilled by the batteries made by Dr. Emil Stöhrer, of Dresden, and commonly called after his name. Their force is derived from zinc and carbon elements, by the action of chromic and sulphuric acids, and the glass vessel containing sulphuric acid can be so lowered down that the elements are no longer immersed, and all action ceases. When this vessel is raised, action immediately recommences; and hence the battery is always in order, always ready for work, and only requires to be freshly charged at long intervals of time. The whole is enclosed in a locked box, which may be inclined to an angle of sixty degrees with the horizon without risk of spilling its contents; and if this inclination be exceeded, or if the box be upset, the acid runs out through a hole left for its escape, and does no damage to the coil. As usually sold, the box contains rheophores or conductors that are well adapted for the localised electrisation of muscle, but not for producing artificial respiration. To effect this in the best way, it is necessary to direct the current upon one of the phrenic nerves, where it crosses the scalenus muscle. The deep penetration of electricity requires that the rheophores should be thoroughly wetted, and that moderately firm pressure should be used. Moreover, in order to make sure of the phrenic nerve in an emergency, the rheophore should have a surface sufficiently large to cover the whole width of the region that it traverses. These conditions are best fulfilled by a rod of brass, furnished at one end with an insulating handle, and at the other with a flattened brass knob of perhaps an inch in diameter. The knob should be covered with a layer of fine sponge, sufficiently thick to absorb moisture freely. To complete the circuit any common rheophore may be employed, furnished with sponge in the ordinary way; and both sponges should be well moistened with salt water, or with water alone if time presses. When it is desired to commence artificial respiration, the special rheophore should be connected with the positive pole of the induced circuit. The other, connected with the negative pole, should be placed

lighly upon the sternal region, and then the special rheophore should be applied, with steady pressure (so directed as not to compress the trachea), upon the margin of the sterno-mastoid muscle where it crosses the scalenus. The sterno-mastoid should be relaxed by position of the head; and the passage of a moderate current will usually produce energetic contraction of the diaphragm. As soon as this takes place the cervical rheophore should be raised, to allow the muscle to relax by the withdrawal of the current. It may be reapplied after a few seconds, possibly to the phrenic nerve of the other side; and should be so used as to produce and maintain the closest possible imitation of natural breathing. When, on the removal of the rheophore, natural breathing takes place, the patient may be pronounced safe, and may be turned on to his left side for nature to complete the process of recovery.

For this method of applying electricity to produce artificial respiration, we are indebted to Professor Ziemssen, of Greifswald, who has recorded some highly instructive cases of restoration from apparent death by its means; not only in chloroform cases, but in suspended animation from drowning, from the inhalation of noxious gases, and other causes. We have dwelt at some length upon the details of its employment, because there is a sad lack of clear knowledge about the matter. The evidence given before the Coroner in some cases of so-called "accidental" death from chloroform has shown that what was called "galvanism" was either not employed at all, or was employed in such a way that it could not possibly be productive of benefit. We have even heard of one case in which the galvanic operator percussed the chest with the two rheophores alternately, never having both in contact with the body at once, and, therefore, never passing any current at all. We have heard of another in which one of the conductors used was a dry brush of metallic wire, the current from which would affect the skin only; and, being quite powerless to excite respiration, would be only comparable to that "flipping with a towel" which we have already condemned. In any case of suspended animation or apparent death from chloroform, if electricity is used at all, it should be used in a certain definite way, and to produce a certain definite effect—that is, the contraction of the diaphragm.

In experiments upon small animals the use of electricity has not been attended by favourable results, and has been found to paralyse the heart, probably by exhaustion of its muscular energy. There are theoretical reasons why this should happen; and there are also reasons for believing that the diaphragmatic respiration produced is too forcible to be that which is best adapted to promote recovery. Against such experiments and such reasoning we have the probability that, in both these

respects, the balance of human functions is less easily disturbed than in the case of rabbits and puppies; and we have also the fact (of which Ziemssen's history of the case of Otto Krause affords the most notable example) that a child has been recovered from apparent death after three minutes' total cessation of breathing, by such faradisation of the phrenic nerves as we have described. Examples of the same kind, and of almost equal interest, have also been recorded by other competent observers.—*Lancet, Jan.* 22, 1870, *p.* 125.

DISEASES OF THE ORGANS OF DIGESTION.

30.—THE THERAPEUTICS OF CHRONIC CONSTIPATION.

By Dr. JOHN KENT SPENDER, Surgeon to the Mineral Water Hospital and to the Eastern Dispensary, Bath.

[The usual professional treatment of chronic constipation of the bowels is very unsatisfactory. It removes the difficulty of to-day without lessening that of to-morrow.]

The plan which I now propose does bestow some care on the future, and professes to be, so far, curative in its operation. It comprises four therapeutic factors; (*a*) minute and frequent doses of watery extract of aloes, very rarely of extract of colocynth; (*b*) a dose of sulphate of iron (gr. jss. or ij.) always combined with each dose of the direct aperient; (*c*) regulation of the diet; (*d*) constitutional exercise. I have to write chiefly of factors (*a*) and (*b*). The quantity of extract of aloes, in all but extraordinary cases, should not exceed one grain. It is conveniently given in the form of a pill. With this pill there should always be mixed a dose of sulphate of iron varying from one to three grains; this is the essential point of the treatment. Any other tonic of the neurotic kind cannot supply the place of the iron; for the purpose I am now relating, iron is not only *facilè princeps*, but it is not interchangeable by anything else. Extract of nux vomica may be added, if the prescriber pleases, as an ornamental appendage or as a means of blending the other constituents together; and belladonna is a remedy of definite auxiliary power, but both these drugs, *quoad* constipation of the bowels, are uncertain or unsatisfactory, and rarely do permanent good. I begin, then, by desiring an adult patient to take a pill composed as above three times a day, immediately after the principal meals. He is cautioned that at first there will be probably no apparent effect, and that two or even three days may pass before any medicinal evacuation of the bowels takes place, perhaps even then difficult and discomforting. But within the next forty-eight hours there will be most likely an evacuation

of the bowels once or possibly twice in the day; *but nothing approaching purgation ought ever to be permitted*, and therefore the patient must be instructed, on the occurrence of the first loose motion, to withhold a pill, and to take only one in the morning and one in the evening. He then continues for a time his morning and evening pill, and is pleased to discover that so slender a medicament has such a decided effect. Not improbably, at the end of another week or fortnight, he is compelled by the same reason as before to drop another pill, and the same result is now brought about by one pill daily, as was originally produced by three pills. Within another month, he may reduce his allowance of medicine to a single pill once or twice a week; and, finally, his whole scheme of medical treatment becomes merely preventive in its design and scope, and he takes a pill occasionally for the sake of maintaining health and warding off old troubles.

When there is a real or fanciful difficulty in the administration of pills, the best way of carrying out the plan above described is by combining the *mistura ferri composita* with the *decoctum aloës compositum*, the doses being determined by an application of the same principles. There is wider room for the addition of auxiliary drugs, but, on the whole, I have not obtained such satisfactory results by this method.

I cannot lay too much stress on avoiding anything like an over-purgative effect by the drugs employed. If on this account the treatment has on any occasion to be stopped, there is so much time lost and so much ground to be retraced. A patient may, unintentionally, exaggerate his difficulties, but the skilful practitioner will not therefore depart from the fundamental principle of minute and frequent doses of his medicine. In this way Nature is coaxed and assisted, instead of being forced and worried; and I declare without hesitation that only by this means can a sure and permanent benefit be realised.

The urgency of regulating the quantity and quality of the food is so obvious, that I need add nothing to what has been so well laid down by systematic writers. The necessity of constitutional exercise—a definite amount every day—is equally clear, and its physiology requires no illustration here. The serious and ingravescent forms of constipation which are secondary to stricture (cancerous or fibrous) may be temporarily relieved by the plan I have sketched; but ultimately the obstruction will defy all ordinary remedies, and our suspicions should be aroused to the possibility of organic disease, whenever a retrograde step occurs again and again after apparent success has been attained.

I append outlines of a few cases:—

Case 1, 1863.—The widow of a clergyman, aged 72, had taken for twelve years a strong dose of drastic medicine once a week,

without which she alleged that the bowels would scarcely ever be moved at all, or only with extreme difficulty. She was confined to her bed, or to her room, by some obscure injury of the hip-joint. She took three iron and aloes pills daily, with an almost immediately good result; and, at the end of three months, she was able to relinquish medicine almost entirely. Until her death, in the autumn of 1865, she had an action of the bowels nearly every day, without any aid from the pills, or perhaps a pill once a month.

Case 2, 1867.—A young man, aged 21, assistant in a bookseller's shop, suffered from extreme constipation. His habit was to have an action of the bowels only once a week, or thereabouts. The pills were taken four times a day for two or three months with scarcely any result. Suddenly everything came right, but he continued the pills in diminishing numbers for nearly a year to prevent relapse. At present he rarely takes any, and enjoys good health.

Case 3, 1868.—A clergyman, aged 43, had suffered for some years from constipation, which, however, was qualified by the fact that mild aperient medicine easily caused diarrhœal purging; and this, again, was succeeded by constipation worse than before. Here I lost ground in my treatment, at first, by prescribing overdoses of the extract of aloes: but a quarter of a grain with the sulphate of iron three times a day answered precisely, and he is now reducing his medicine month by month.

Case 4, 1864.—The daughter of a tradesman, aged 18, had suffered from early childhood. Previous medical advice had sanctioned the routine treatment of a very powerful dose, once a week, of senna, aloes, and sulphate of magnesia, and this had been continued for several years. In less than three months my plan succeeded so well (assisted, of course, by appropriate diet and systematic daily exercise) that no medicine was required for some time. She now (1869) takes a precautionary pill every three or four weeks.

Case 5, 1867.—A poor woman, aged 37, consulted me at the Eastern Dispensary, Bath. Symptoms very aggravated and painful. Here aloes entirely failed, and so I gave, three times a day, two grains of compound colocynth pill with two grains of sulphate of iron. Complete success in four months, so that no medicine of any sort was needed.

Case 6, 1868.—The wife of a military officer had been compelled for several months to take every day (or nearly every day) three grains of compound colocynth pill, in order to obtain a satisfactory evacuation of the bowels. I persuaded her to adopt my plan, and I found that she required only a quarter of a grain

of aloes with the iron in each pill. She now takes only one pill daily (the treatment was begun ten weeks ago) with an excellent effect, and the health is much improved.

I remember one case in which only $\frac{1}{12}$ of a grain of the extract of aloes was taken from the very beginning. In every instance I have quoted the amelioration of the general health was remarkable, due partly to the hæmatinic properties of the iron, and partly to the removal of the incessant dread and worry of being obliged to take painful and potent medicines. A haggard nervous face becomes bright, and a weary step becomes elastic and quick. I have often combined cod-liver oil with the pills, and the result has been usually good. The amenorrhœa which is sometimes associated with constipation in women is curable *pari passu* by the same means; and, if pregnancy exists, the prospects of parturition are made more encouraging if the treatment be carried out with suitable watchfulness.—*Medical Times and Gazette, Feb.* 19, 1870, *p.* 201.

31.—OBSERVATIONS ON SWALLOWING INDIGESTIBLE SUBSTANCES;

WITH THE PARTICULARS OF AN INSTANCE IN WHICH A GOLD PENCIL-CASE PASSED INNOCUOUSLY THROUGH THE GULLET, STOMACH, AND INTESTINES.

By Sir Wm. Fergusson, Bart., Sergeant-Surgeon to the Queen.

Cases are familiarly known, both in domestic annals and among the profession, of indigestible substances having been swallowed and subsequently evacuated from the rectum, without having produced any inconvenience whatever. These have usually been rounded or smooth-edged, such as bullets or coins, and occasionally sharp-pointed or sharp-edged objects, such as gold plates with false teeth, or pins for holding them, or with sharp hooked extremities to grasp neighbouring sound teeth. Even blades of knives have passed innocuously through the tortuous route of the alimentary canal. It is often a marvel to the anatomist and physiologist how these have not caught in some of the narrow corners or fringes of mucous membrane. It seems to me more remarkable than that they should catch or be held permanently in some part of such a devious route. Instances are well known of plates, with and without false teeth, and other foreign objects lodging for a time in the gullet or pharynx, some of which have passed downwards, some have been ejected by vomiting, or been hooked up by the surgeon, whilst some have remained in their unnatural position for years. I know of a case of this kind, where false teeth and gold plate have remained in the lower part of the gullet for years. A collection of such cases would add an interesting chapter to "The

Curiosities of Surgery." Although fatal effects are often produced by foreign objects in the gullet—by suffocation, ulceration, and opening of the aorta—experience has proved that the greatest danger is in the stomach and intestines. It is wonderful with what facility a passage has been permitted to the stomach; but after this the "difficulties" have begun. In the museum of the Royal College of Surgeons many remarkable illustrations of the kind are preserved. In particular there is one preparation showing an ordinary dessert-spoon sticking in the ileum and cæcum, which had been swallowed, but had stuck fast there, and caused death by ulceration; and another, a dessert-knife, eleven inches long, which, being arrested in the stomach, had ultimately caused a fatal termination. There are also specimens of blades and handles, or eroded portions of pocket-knives, which had been passed per anum. Mr. George Pollock published in the first volume of the *Lancet* for 1869 an interesting paper on "Cases in which Artificial Teeth were Dislodged and Swallowed, or Impacted in the Pharynx;" and in the same volume Dr. Bond has recorded an instance where a large buckle for braces was finally, after some weeks' residence in the gullet, pushed down into the stomach, where it caused no inconvenience. Within these two years I have myself seen an instance of the safe passage of four false front upper teeth, with gold settings, in three days, through the stomach and intestinal tube.

Perhaps the most remarkable case ever known of swallowing indigestible materials is that recorded by Dr. Marcet, of Guy's Hospital, in the twelfth volume of the Medico-Chirurgical Transactions (1823). John C., a sailor, twenty-three years of age, in the course of ten years from that date, swallowed at different times at least thirty-five knives. Some of these, or eroded portions, were occasionally vomited or passed per anum. He finally died of exhaustion, after much suffering; and, on opening his body, forty different pieces of blades and handles were found in the abdomen. These were chiefly in the stomach, but some had reached as far as the rectum. One portion of metal—a back spring, measuring $4\frac{1}{4}$ in. long—had become impacted in the descending colon, and one end, being sharp pointed, had perforated the coats, so as to project into the peritoneum. Another portion was found in the rectum, with one end projecting through, so as to be held fast in the pelvis. It is wonderful how far these portions had proceeded along the intestinal canal. The separation of the knives into their component parts, the erosion of the metallic portions, and the disappearance of the horn of the handles, all evince the influence of the fluids on these different materials. It might be a question where such effects were chiefly produced; and,

doubtless, the gastric juice would be considered as playing the principal part. If sheer exhaustion had not finally carried this person off, might not all these remaining portions have disappeared in time? Notwithstanding our admiration of hartshorn and of iron, it seems certain that, when thus taken into the body, life is greatly jeopardised; and that in such doses, the sooner evacuation takes place the better for the patient.

But is it reasonable to expect that such large objects will pass through the tortuous course from mouth to anus? The anatomist and physiologist would be inclined to think such a thing impossible, but experience has proved that it is realised occasionally. Instances referred to at the beginning of this paper are examples of the fact; and in the museum of the College of Surgeons a number of portions of metal, knife-backs, &c., have been preserved as having been evacuated by a soldier who, like his compatriot the sailor, had indulged a fancy for swallowing clasp knives. Even the long portion in the descending colon of C. had been arrested by a kind of accident we may suppose, for, as the anatomist knows, it had passed all the places where it was most likely to have stuck fast—the pylorus, the duodenum, the numerous folds of the small intestines, the valvulæ conniventes—even the ileo-cæcal valve! Yet it stuck fast in a wide part of the larger intestines.

To show that hope may be entertained in some such cases I venture to put the following case on record as the most remarkable that has ever come under my personal observation.

A gentleman about fifty years of age, tall and stout in frame, had tried on several occasions to destroy himself, but had been thwarted in his intentions by the vigilance of his attendants. His habits were occasionally very intemperate, and recently, during such condition, he had tried to throw himself out of window, to set fire to his night-dress, and to stab himself in the abdomen with a breakfast knife. He had inflicted seventeen wounds in the skin near the umbilicus, but none of them penetrated much beyond the surface. An attendant was in the room with him day and night, and all edged instruments were carefully kept away.

Early on the morning of January 2nd, 1870, he seemed as if choking, with his head under the bedclothes; but speedily recovered, and when asked what was the matter, he said it was only a cough, and soon became quiet. His attendant feared that he must have swallowed something, but he denied any such act, and nothing more was said on the subject at the time. Among the articles in his bedroom a gold pencil-case was missed. A careful search was made, but he seemed indifferent as to the result, and expressed his conviction that it was not lost. On the day in question, and the following, he was feverish

and occasionally vomited; he could not swallow solids, but partook readily of fluids. On the third day he took food as usual, and made no special complaint. There were ample grounds for suspicion that the pencil-case had been swallowed. The patient was silent on the subject, and as no good appeared likely to arise from urging a confession, nothing was said to him about it. He was encouraged to eat solid food, and the attendants were enjoined to watch the alvine evacuations. As I had to dress the wounds on the abdomen, I had ample opportunity of manipulating so as to detect any tender spot within. He occasionally complained of pains, but these seemed to me more imaginary than real.

On January 19th he confessed that he had swallowed the pencil-case, and then I explained what might possibly ensue. In particular, I said that it might find its way to the rectum, and produce irritation there. The following morning he fancied that it was in that locality. I examined, and introduced a lithotomy forceps, but nothing could be felt.

On the morning of the 24th, whilst on the stool, he felt that something unusual had passed, and the case was found in the evacuations. Twenty-two days had elapsed since it had been swallowed, and with the exception of the annoyances of the first twenty-four hours, when it had doubtless been in the gullet, I doubt if there had been a twinge of pain dependent on its progress downwards. It might have been interesting in a surgical point of view to have extracted it from the rectum; but the story is more valuable as showing what nature may do under similar circumstances. There has been no irritation nor complaint of any kind in the gullet, stomach, or bowels since.—*Lancet, March* 12, 1870, *p.* 368.

32.—CHLOROFORM IN THE TREATMENT OF BILIARY CALCULI.

By Dr. JOHN BARCLAY, Physician to the Infirmary, Leicester

Seeing some reference in a contemporary periodical, to the proposed use of chloral as a solvent of biliary calculi, I crave space to state that I have met with very great success from the internal administration of chloroform in that disease.

I first used it in 1861, in the case of a clergyman, aged 58. He had suffered for twenty-three years from gall-stones; the peculiar pain, jaundice, with subsequent discharge, by stool, of the calculi, coming on so suddenly and without warning, as seriously and frequently to interfere with his duties. Just then, writing on alcohol, I had been studying the experiments of Lallemand and others, on the existence of alcohol unchanged in

the blood. Knowing that ethers are solvents of cholesterine, I ventured, on his third attack in that year, to prescribe chloroform in doses of two or three drops, three or four times a day, on the chance of its reaching the calculi through the blood. To his surprise, and my gratification, pain, tenderness, distension and jaundice disappeared together, and in the eight years since elapsed, he has never had another attack. He keeps a bottle of "chloric ether" by him, for occasional use. I have found it to give invariable and permanent relief in many instances since.

The theory of thus dissolving the calculi *in situ*, followed by the disappearance of the symptoms, leads to a deduction that may be legitimate, that relief was obtained by their being so dissolved—*British Medical Journal, Jan.* 15, 1870, *p.* 51.

DISEASES OF THE URINARY ORGANS.

33.—ON A PURELY MILK DIET IN THE TREATMENT OF DIABETES MELLITUS.

By Dr. ARTHUR SCOTT DONKIN, Lecturer on Forensic Medicine to the University of Durham, and Physician to the Sunderland Infirmary and Dispensary.

In a previous contribution I gave a full detail of two cases of diabetes mellitus treated by an exclusively skim-milk diet, with the subsequent addition of animal food and green vegetables for dinner, after convalescence had been for some time established. In one of these cases—the boy, T. H., aged seventeen—the treatment was successful, and a cure rapidly resulted, inasmuch as the sugar was completely removed from the urine, while the patient's health and strength were perfectly restored. The other case—that of W. H., the seaman, aged thirty-one—was not so successful, a small quantity of sugar remaining permanently in the urine, although the general health was perfectly re-established. But this less favourable result was attributed to two causes: first, to the long continuance of the disease (nineteen months after its full development) before the treatment was begun; and, secondly, to the fact that the patient frequently partook, clandestinely, of prohibited articles of food, especially bread, as I afterwards discovered. If the treatment had been commenced when the disease was first recognised, and the patient had been educated, intelligent, tractable and capable of appreciating the necessity for a dietetic course of treatment, and above all, if he had been in a good position in life, instead of returning home to abject poverty, I feel assured the result would have been even more favourable, and probably completely successful.

Dr. Francis Home first indicated the value of an animal diet in the treatment of diabetes mellitus, and it is now nearly three-quarters of a century since the diet he indicated was reduced to a system by Dr. Rollo, in the important work he published on the subject. During the period which has since elapsed a diet more or less purely animal, as indicated by him, has been recognised as the proper and only available treatment to be employed against this most formidable malady. But the treatment of Rollo, either absolutely followed out or modified by the admission of certain kinds of vegetable food, is not by any means so universally successful as could be wished. The life of the patient is sometimes cut short during the treatment by the sudden accession of inflammatory affections of the abdominal and thoracic viscera. Dr. Bardsley specially directed attention to this fact. Besides, it is exceedingly difficult to enforce a strict adherence to animal food for any length of time; with some individuals, indeed, it becomes almost intolerable. Dr. Rollo himself even lamented that this mode of treatment should be so repulsive to the patient. A purely milk diet, however, is free from these objections; milk being generally relished by the patients, especially at the outset of the treatment, when the thirst is intense. Afterwards they never tire of it, although they generally express a desire for solid food in addition.

From the experience I have already had, I have not the slightest hesitation in asserting that the milk treatment of diabetes is as superior to Rollo's, with its more modern modifications, as Rollo's was to any method previously in use. But it is necessary to add that *it must be persevered in methodically and exclusively until convalescence is established.* If this rule is not followed from the beginning the result will not be successful.

The efficacy of this treatment need excite no surprise when we know that the disease has hitherto been amenable only to the protracted employment of a dietetic course. The *rapidity* with which milk acts is truly surprising, twenty-four hours being sufficient for the production of a marked improvement: the quantity and density of the urine suddenly fall, and, *pari passu* with this change, the thirst and voracious appetite disappear, the skin becomes moist and perspiring, while the symptoms referable to the nervous system are as rapidly relieved; profound refreshing sleep succeeds to the previously sleepless, restless condition, rendered almost intolerable by the incessant thirst. The patient expresses himself thankful for the sudden and unexpected change. In the two cases I have recorded this sudden relief was obtained. I may mention, too, that a third case is now under my care, in which, by the same milk diet, and *without any other remedy whatever*, the urine fell from 23 pints, sp. gr. 1038, to 9 pints sp. gr. 1040 in twenty-

four hours, and to 6 pints, sp. gr. 1038, at the end of the third day of treatment; in other words, there was *a diminution of* 14 *pints of urine and about* 19 *oz. of sugar in twenty-four hours, and of* 17 *pints and about* 24 *oz. of sugar in three days.* A result like this seems almost incredible; but I may add that this astonishingly rapid improvement in the urine was accompanied by a correspondingly rapid abatement of the other prominent symptoms of the disease. I shall, however, give a complete history of this case in a subsequent communication. I have no doubt that others will, on trial, find the remedy to act with the same magical rapidity as I have done.

But that milk should exercise a more powerful influence over diabetes than even a purely animal diet can, I think, be explained by the fact that the caseine of milk, being a primitive albumen, is infinitely superior, as an agent of nutrition, to the albumen of muscle, which has been highly and specially organised to perform an important vital function. Besides, the sugar which milk contains is quite innocuous in the disease (as shown by my experiments), and it supplies the system with a saccharine, proximate, alimentary principle equivalent to such as is afforded by vegetable food. There can be no doubt that the sugar of milk is destined to supply for the nutrition of the young an equivalent for the amylaceous and saccharine principles entering so largely into the food of the adult.

It is erroneous to suppose that a moderate quantity of sugar is injurious in diabetes. Sugar cannot be again converted into sugar by any morbid process in operation in the liver or elsewhere, and cannot therefore supply a pabulum for the activity of the morbid process by which diabetic sugar is elaborated. Starch seems to be the fuel requisite to maintain the morbid action of the disease in all but the most advanced cases, and it would appear that this substance, and every species of food containing it, should be prohibited, even in complete recoveries, for a long period, after health has been re-established, and sugar long absent from the urine. The necessity of this precaution was shown in the case of the youth, T. H., who, before he left the infirmary, clandestinely partook of large quantities of bread, the result being that some sugar reappeared in the urine; but in three days this again totally disappeared, after bread had been strictly prohibited. In some individuals the tendency to the formation of sugar, from the malassimilation of amylaceous substances, may possibly be so great as to become an idiosyncrasy. But what length of time must elapse before permanent security is reached can only be ascertained by direct experiment; doubtless it will be found to vary much in individual cases.

The success of the milk treatment of diabetes shows that in this disease it is by no means necessary to limit the quantity of fluid taken by the patient, as has been supposed by some authorities. The thirst bears a definite relation to the quantity of saccharine urine voided, and rapidly subsides when the latter has been reduced to a nearly normal condition.

These observations will, I trust, stimulate others to investigate the subject for themselves. I shall only add that in all probability milk will be found, from the nature of the organic compounds it contains, to be the most potent remedy we shall ever become acquainted with in the treatment of diabetes mellitus.—*Lancet, Nov.* 27, 1869, *p.* 735.

34.—ON THE TREATMENT OF DIABETES BY MILK, &c.

By Dr. GEORGE W. BALFOUR, Physician to the Royal Infirmary, Edinburgh.

A diet restricted to milk alone, and a diet composed partly of milk, are very different things in regard to the cure of disease; and many ailments which will yield to the one are wholly uninfluenced by the other. Milk, as a curative article of diet, has been very highly extolled from the earliest times; but, in recent days, it has found its most enthusiastic exponent in Dr. Karell, of St. Petersburg, whose original paper in the *Edinburgh Medical Journal*, for August 1866, p. 97, I commend to your attention. There you will find the whole history of this mode of cure, and several very remarkable cases by Dr. Karell himself, selected from a total experience of 200 cases. I need not stop now to inquire how the milk acts, because beyond that it acts as a peculiar system of diet which means nothing, we know nothing; it is something more to the purpose that it is a diet procurable by the poorest, and one which can be readily taken and persevered in by all ranks and classes for months or years. The great Professor Black adopted it for many years before his death, because he thought it ought to be the natural food of an aged man commencing his second childhood: he died with a bowl of milk in his hand, and so quietly, that he did not spill a drop of it. I have known it successful in curing a very severe asthma, which had for years resisted every kind of treatment with the greatest obstinacy, and several very obstinate cases of general ill health; of late it has been brought before the profession by Dr. Donkin, of Durham, as a cure for diabetes mellitus, for Bright's disease, and for other forms of imperfect and deficient nutrition. In our own case, we had every reason to be satisfied with the results obtained. The patient was a woman named F., admitted 14th December, five months ill, and considerably emaciated. Her age was 51—so far favourable, be-

cause the older, within certain limits, the more amenable patients usually are to treatment. On her admission she passed ℥240 of urine, sp. gr. 1043, and drank ℥100; she was kept under observation for five days, being placed on full diet; her urine, during this period, varied from ℥240 to ℥174, sp. gr. always above 1040, the amount drunk varying from 5 to 6 pints. On the 20th of December she passed only ℥174, but on the 18th she had done the same; while on the 19th it again rose to ℥240. Obviously, therefore, there had been on the full diet alone no steady improvement, and no guarantee, nor from past experience any likelihood, that it would remain at that low figure. On the 21st, she was placed upon 6 pints of skim-milk for her sole diet, no other article of food to be taken; that day her urine fell to ℥120. She required no extra drink. On the 22nd, she passed only ℥110, and the amount continued to fall till the 26th, when it was only ℥90, but still remained at the sp. gr. of 1040. She was dismissed on the 30th ult. at her own request, in consequence of domestic affliction. Up to her dismissal her urine continued steadily at ℥90, but fell in sp. gr. so low as 1033 the day before she left. Obviously this woman was not cured, but she had certainly made a very remarkable improvement during the short time she was under treatment; and had she remained longer with us, I have no doubt that she would have been cured. As it is, her treatment, involving only a diet at once simple, easily procurable, and inexpensive, can be readily carried out at home, and I daresay she may there succeed in perfecting her cure. This treatment does not exclude the employment of opium, of iron, or quinine, or any other remedies otherwise considered appropriate to such cases; indeed they may be very properly conjoined—in our patient they were not given, because not required. From two to three months is the period usually stated as sufficient to cause the complete disappearance of sugar from the urine; and then the diet may, if desired, be rendered more solid, by the detraction of some of the milk, and the addition of butcher's meat and green vegetables. It is doubtful, however, whether diabetic patients, even though apparently cured, can ever return to ordinary diet. Present experience of such cases is too limited to afford any data at all in regard to this. When the milk diet is employed in the cure of other forms of ill health, it is often conjoined after the first few days with a small amount of solid food; and what such patients relish most is plain bread with salt, or a salt herring, the mawkish sweet taste of milk inclining them this way. In diabetes, the thirst present usually makes it better to give the patient his full allowance of milk, and let him divide it over the day as he pleases. For other classes of disease the amount of milk must be at first restricted to two or three pints in the day, to be taken in divided portions at regular

intervals. Except in the case of ulceration of the stomach, in which, from the great irritability and tendency to vomit, as well as the absolute necessity of keeping the stomach empty, and passing the fluid food through it to be digested in the intestines, it is absolutely necessary to give the milk in such small doses as ʒss. every half-hour; or, in serious cases, where there has been much hemorrhage, or where great irritability is present, even only once every hour; and such cases—kept, of course, in the recumbent position—will not only live, but actually thrive on this meagre diet.—*Edinburgh Medical Journal, Feb.* 1870, *p.* 709.

35.—ON THE INFLUENCE OF CODEINE IN CONTROLLING THE ELIMINATION OF SUGAR IN DIABETES.

By Dr. F. W. Pavy, F.R.S., Physician to Guy's Hospital.

[Dr. Pavy relates a number of cases of diabetes treated by the administration of opium, morphia, codeine, narcotine, and narceine. These cases are given in the fullest possible manner, the quantity of urine per day, its sp. gr., the quantity of sugar in each fluid ounce of urine, and the quantity in the twenty-four hours' urine, are all given, for every day under treatment, along with the form of opiate given, and the dose. These cases occupy forty-six pages of the Guy's Hospital Reports. They afford most direct evidence of the possession of a powerful controlling influence by certain of the agents used over the elimination of sugar in diabetes. Dr. Pavy says:]

I may state that I have never hitherto been able to accomplish, by medical treatment in diabetes, the same or anything like the same that I have been accomplishing lately. Of the agents as yet tried, opium, morphia, and codeine are those which may be spoken of as evidently enjoying the power mentioned. In two of the cases belonging to this communication I gave narcotine to the extent of five grains three times daily without observing any visible effect. Narceine I have only tried once, and then it did not seem to exert the slightest action. Moreover, narceine is a very insoluble principle, and doubts may be entertained if much of what is administered gets absorbed into the system.

Of opium, morphia, and codeine, the last, I consider, possesses the most advantageous properties. As far as my experience, including that amongst hospital in-patients and out-patients and in private practice, enables me to judge, I cannot help thinking that codeine will be found to prove a valuable agent in the treatment of diabetes. In some cases it appears to possess the power of exerting a direct curative action. In others, however, although it has been found, particularly for a while, to

control the elimination of sugar and improve the general condition, yet it must unhappily be said that it has afterwards proved powerless in averting an unfavourable termination.

The great advantage of codeine over opium and morphia is that it is equally efficacious in controlling the disease, and does not exert the same narcotic effect. When given in a small dose to begin with, and increased gradually, nothing may be perceived beyond its effect upon the disease. Half a grain I consider an appropriate dose to begin with, and, as seen by the following cases, I have given it to the extent of ten grains three times daily. Beginning with one grain three times a day, a little drowsiness, giddiness, and perhaps headache, may be complained of. I have begun with two grains three times a day; but the dose had to be reduced to one grain on account of the disturbance of the cerebral functions that was produced. Under its employment I have not observed the pupils to become contracted, nor have I noticed any marked constipating action. It may, perhaps, have a little tendency this way, but nothing certainly to any marked extent. The tongue, in some of the cases, I have particularly noticed to be conspicuously clean and moist. The appetite, as a rule, has not been affected by it.

In all the cases the agents were administered in the form of pill. I think it desirable, for the sake of precision, to mention that it was from Mr. Morson, of Southampton Row, that the codeine, narcotine, and narceine employed were obtained.

I consider that the only way of obtaining precise information about the action of an agent administered in diabetes is through a daily analytical examination of the urine. The patients in the hospital under my charge, whose cases are forming the subject of observation, are directed to preserve all the urine passed from a certain hour one day up to the same hour the next. After all has been mixed together and the quantity ascertained, a specimen is taken to my physiological laboratory for examination. Here the sp. gr. is noted, and a quantitative determination of the sugar effected. Thus it was that the several results mentioned in the cases were obtained.—*Guy's Hospital Reports*, *Vol.* xv, 1870, *p.* 420.

36.—ON THE VARIATIONS IN THE ACIDITY OF THE URINE THAT OCCUR WHEN VEGETABLE AND MINERAL ACIDS ARE USED.

By Dr. H. Bence Jones, F.R.S.

Not long since a positive statement was made to me regarding the effect of lemon-juice on the acidity of the urine. I was assured that occasionally it made the urine alkaline. I knew, from the analysis of lemon-juice, that there was so little alka-

line and earthy salts present in it, that they could not produce this effect; and I knew, from the variations that take place in the acidity of the urine in health, that most probably a result that was simply *post hoc* was considered as *propter hoc*. Moreover, I had an imperfect recollection, that many years ago I had made some accurate experiments, which I had not published, to determine what effect the lemon-juice had on the acidity of the urine. After a long search, the notes of the experiments were found.

It is very evident that the natural variations of the acidity of the urine are so great as almost to hide the effect which even twelve ounces of lemon-juice in the day can produce.

Nearly 400 grs. of citric acid in the lemon-juice raised the acidity nine degrees higher than it rose on the previous day when no acid was taken, and uric acid crystals were found. But the decrease of acidity that occurred when food was taken was just as great on the day the citric acid was taken as it was on the day when no citric acid was taken. When the lemon-juice on the following day was again taken, the rise of acidity was not quite so high as on the day previous; but uric acid crystals again formed in the urine, and the decrease of acidity after food was ten degrees less than at the same hour on the first day when no lemon-juice was taken. On the day following those two on which lemon-juice was taken, no variations of the acidity of the urine occurred that could be attributed to the action of the lemon-juice.

The effect upon the acidity of the urine of this large quantity of citric acid in the lemon-juice is quite evident. But the natural variation of the acidity is less influenced by the acid than might have been expected; in other words, much less citric acid passed off by the kidneys than was taken into the stomach.

It is very apparent that the action of digestion far surpasses the action of large doses of lemon-juice on the urine. So much so, that if the urine had only been examined four hours after breakfast, its alkalescence might have been attributed to the action of the lemon-juice. And there can be no doubt that the statement, that lemon-juice makes the urine alkaline, arose from some observation of this kind.

The pre-eminence of the natural variations is also seen in the experiments on the variations of the acidity of the urine when full doses of sulphuric acid were taken, published by me in the *Philosophical Transactions* for 1849.

The result when tartaric acid was taken agrees very closely with the results when lemon-juice was taken, allowance being made for the difference in the amount of acid in the lemon-juice and tartaric acid, and for the average acidity of the urine

being higher when the lemon-juice was taken than it was when the tartaric acid was administered.

The amount of citric acid taken daily in the lemon-juice was from two and a half to four and a half times more than the amount of tartaric acid; and from these experiments also it can be seen that a small portion only of the tartaric acid taken passed off in the urine.

Generally, then, it may be said that lemon-juice and tartaric acid have the same action in increasing the acidity of the urine, and that neither of these acids, even when taken in very large doses, produces as much effect on the acidity of the urine as is produced by the action of digestion.

It is very desirable that a much longer series of exact experiments on the variations of the acidity of the urine when vegetable and mineral acids are taken in health should be made; and the effect of sugar and starch in increasing the variations of the acidity of the urine should also be determined. Then we shall have better reasons for some of our rules of diet than we at present possess; and we shall be able to use these substances with more effect as remedies. The contrast of a purely vegetable diet with a purely animal diet for a very short period in effecting variations of the acidity of the urine I have given in the *Philosophical Transactions* for 1849.

Generally in the treatment of ammoniacal urine, long courses of mineral acids have no distinct chemical effect upon the urine. Vegetable acids and sugar have also no immediate visible effect.

For good observations the reaction of the urine must be determined at a fixed period each day, at the time when the digestion is not going on; and the length of time that the urine has remained in the bladder must, as far as possible, not vary in the different experiments.

When accurate observations are made, it will never be found that lemon-juice, or any other free vegetable or mineral acid, can cause the urine to become alkaline; although, when there is an irritable stomach, the urine may frequently be found to be alkaline during digestion, even when vegetable and mineral acids are taken in large quantities.—*St. George's Hospital Reports, Vol.* iv, 1870, *p.* 3.

SURGERY.

AMPUTATIONS, DISLOCATIONS, FRACTURES, &c.

37.—OBSERVATIONS ON AMPUTATION AT THE HIP-JOINT.

By THOMAS ANNANDALE, Esq., Surgeon to the Edinburgh Royal Infirmary.

[Although the immediate risks of amputation at the hip-joint have been considerably diminished by the introduction of chloroform and efficient compression of the abdominal aorta, yet the result of cases from the exhaustion attendant upon healing of such a large wound is too often fatal.]

I think it is justifiable to consider, that the immediate shock to the system, caused during the infliction of this and other large wounds, is much diminished, if not prevented, by having the patient completely anæsthetized; and there can be no doubt also that, with the assistance of the abdominal clamp, amputation at the hip-joint may be performed, with the loss of only two or three ounces of blood.* Surgeon S. U. Gross says, "The ratio of mortality in all hip-joint amputations has certainly diminished since the introduction of chloroform, and I think we possess in it a powerful agent against shock, which in former days was so fruitful a source of mortality." He says, further, "Hemorrhage, as a source of danger, is now robbed of its terrors by the employment of the abdominal tourniquet for compressing the aorta." Mr. Gamgee, in his interesting account of a case of amputation at the hip-joint, remarks—"But so effectual was the aortic tourniquet that the great arterial mouths were left open and dry, and the operation was concluded as deliberately, and with as little hemorrhage, as an ordinary amputation."

Mr. Erichsen, in his remarks upon this amputation, says, "The employment of Lister's aorta compressor will probably still further reduce the mortality, by lessening the loss of blood, and thus proportionately diminishing those risks of low secondary disease that are induced by serious hemorrhage." Professor

* The total loss of blood may be still further diminished in many cases by carefully bandaging the limb, and raising it above the level of the trunk for a few hours before the operation. This proceeding is especially useful in cases of large and vascular tumours.

Miller, remarks, "The operation is certainly deprived of its horror and danger, to a great extent, by the use of chloroform, and by the employment of the abdominal aorta compressor."

Seeing, however, that even with these improvements the mortality of amputation at the hip-joint is so great, it becomes an important question for the practical surgeon to inquire whether this mortality cannot be still further diminished?

In considering this question, my remarks apply only to those cases in which it is necessary to remove the entire femur by disarticulation, and I would ask—

First, *Can the cut surface made in this amputation be in any way diminished so as to lessen the general shock?*

In some cases requiring this formidable operation, the surgeon has no choice, but must cut his flap or flaps from the most convenient aspect of the limb, and perform disarticulation. In other cases the operation may be performed according to rule, that is, by antero-posterior or lateral flaps, for these are the methods now usually recommended when there is a choice of proceeding. In a few remaining cases the soft textures may be divided at a lower level (through or immediately below the trochanters), and the head of the bone then dissected out or disarticulated. It might reasonably be supposed that the last of these methods would be the least dangerous—(1st), Because the soft textures are divided further from the trunk; (2nd), Because the wound is apparently smaller.

Erichsen in his observations on cancer of bone, remarks,—"When the lower part of the thigh bone, however, is involved, amputation through the trochanters may sometimes be substituted for disarticulation at the hip-joint, the latter operation being so formidable and so fatal that the surgeon may not think it advisable to subject the patient to so serious a risk; or amputation might be performed through the trochanters, and then the head of the bone extirpated from the acetabulum. In this way the severity of the operation and the extent of incised surface would be lessened, whilst the whole of the diseased bone would be removed."

Surgeon R. B. Bontecou, in his evidence on amputation at the hip-joint, says, "I should, however, make the operation by circular incision of the upper third, soft parts permitting, and enucleate the bone by incision, carried up the outside of the limb to the trochanters, believing that the hemorrhage and shock to the system would be less than by the usual methods."

Acting on this principle, I have during the last twelve months operated upon two cases. In the one case the amputation was performed according to Surgeon Bontecou's plan for long-standing ulceration of the leg and thigh, and proved fatal on the fifth day. In the other, the operation was performed by

cutting a short anterior and a short posterior flap immediately below the trochanters, sawing through the bone, and then dissecting out the head of the femur after the vessels had been secured. The disease in this case was a cancerous tumour affecting the lower third of the femur, and the patient lived until the fifth week, when he was suddenly seized with difficulty of breathing, and died forty hours after. The post-mortem examination of this patient showed a partially decolorized clot in the pulmonary artery; the surfaces of the flaps were firmly united, but there was an abscess in the acetabulum; there were no morbid traces of pyæmia.

Being anxious to determine the relative extent of cut surface in these methods of amputating at the hip-joint, I recently made the following observations:—

In an adult male subject, I performed amputation of the right leg at the hip-joint by a long anterior and short posterior flap, and removed the left limb by cutting a short anterior and a short posterior flap immediately below the trochanters, sawing through the trochanters, and then dissecting out the head of the bone. Having then carefully arranged the flaps, and filled up the acetabular cavities, I took a cast of the whole cut surface in each stump. In order to obtain a cast of the surface of a circular amputation, I made a circular division of the soft textures in the left stump opposite a point immediately below the trochanters, and at the same time carried an incision upwards from the outer edge of the wound to the top of the great trochanter, as suggested by Surgeon Bontecou. A cast of the surface of this stump was also taken. Three casts were thus obtained, which, for the sake of convenience, may be named 1, 2, 3. On first looking at these casts, it appeared that the two obtained from the stumps made by a low division of the soft parts had a much less extensive cut surface than the other; but in order to determine this, I asked Messrs. Blyth and Cunningham, the eminent engineers, to measure these surfaces for me. The following is the report of their careful measurements:—

Cast 1, taken from amputation at the hip-joint by a long anterior and short posterior flap, measured 70·54 square inches.

Cast 2, taken from amputation immediately below the trochanters by a short anterior and short posterior flap, measured 80·75 square inches.

Cast 3, taken from amputation immediately below the trochanters by circular incision, measured 76 square inches.

This question must, therefore, I think, be answered in the negative; for, if my observations be correct, they prove that the extent of cut surface in the amputation usually performed is considerably less than that resulting from the other methods referred to; and I do not think that the mere division of the

soft textures at a lower level can compensate for the larger cut surface which such a proceeding causes.

Second, *Can any special treatment of the wound be adopted, so as to influence or lessen the irritation and suppuration during the progress of its healing?*

This question may, I think, be confidently answered in the affirmative.

The valuable observations of Mr. Lister, and the recorded experience of other surgeons, have undoubtedly proved that the suppuration and local and general irritation connected with the largest wounds, are entirely prevented, or very much lessened, by the careful employment of carbolic acid or other antiseptic means.

An additional assistance in preventing or lessening the local irritation is the use of the antiseptic ligature (silk or gut), to secure the divided vessels. In my cases of amputation at the hip, the femoral artery and vein and the smaller vessels were secured with complete success in this way (with gut), and I have, during the last twelve months, used the same ligature successfully in three cases of amputation through the thigh, and also in many other operation wounds.

It is to these means, and to a careful attention to the diet and general condition of the patient, that, I think, we must trust, in order to diminish the mortality following amputation at the hip-joint and the infliction of other large wounds. My own experience of the antiseptic treatment leads me to express a strong opinion that, with care, it will prove successful in bringing about this happy result.

My conclusions in connexion with the subject of amputation at the hip-joint consequently are—

(1.) That chloroform or ether, and the abdominal compressor, are valuable aids in diminishing the immediate risks of this operation.

(2.) That the shock resulting from this operation is not influenced by any low division of the soft textures.

(3.) That the careful antiseptic treatment of the wound, and the use of the antiseptic ligature, are the means most likely to diminish the secondary risks of this operation.—*Edinburgh Medical Journal, April* 1870, *p.* 881.

38.—ON AMPUTATION OF THE THIGH.

By William Stokes, Jun., Esq., Surgeon to the Richmond Surgical Hospital, Dublin.

No topic in surgery has of late years more actively engaged the attention of surgeons than that of determining the method of

amputation of the thigh, which is fraught with least danger to the patient, and affords the most satisfactory results, not only as regards the appearance, but also the form of stump which can be best adapted to the subsequent application of mechanical appliances. The fact that many of such operative procedures have each of them advocates, is a sufficient proof that the opinion of surgeons is still to a great extent unsettled as to the best mode of thigh amputation. There can be little doubt that of the comparatively novel procedures the "rectangular method," suggested first by the late Mr. T. Pridgin Teale, and which in the Dublin School has found such a warm advocate in my friend, Mr. Croly, is one which, perhaps more than any other, has found favour among surgeons. This results from the supposed advantages of this operation, which are doubtless familiar to my readers, and which it is therefore unnecessary to enumerate. However, objections have been raised to this method which are not by any means devoid of foundation. These are—1st, the great extent of cut surface that the operation necessitates; 2nd, the longitudinal division of muscular tissue; and 3rd, the high division of the bone. The amputations of Spence and of Carden get rid to a great extent of these defects. Of this latter operation, the amputation by a long anterior skin flap, notwithstanding the favourable accounts Mr. Carden gives of his results, I cannot think highly. The operation which seems to me to get rid best of two of the supposed defects in Mr. Teale's amputation—viz., the extensive division of muscular tissue, and the high division of the bone—is the method which has been suggested by Mr. Wharton.

It is, I believe, an undisputed fact that, at all events in amputation of the thigh, the nearer to the trunk the bone is divided the greater is the risk to the patient. Dieffenbach, in one of his lectures on amputation of the thigh, pithily expresses this in the sentence, "Zollweise steigt die gefahr," which freely rendered in English means, "the danger increases by the inch." Any modification therefore of the method of the rectangular amputation, which has for its object the saving of bone, and which, in all other respects, affords equally good results as in the method recommended originally by Mr. Teale, must obviously be an improvement. The modification may be given in Mr. Wharton's words:—"Let the measurements for Teale's amputation be accurately taken and mapped out, but instead of dissecting the bone—I am now specially referring to the thigh at the site directed by him—let it be sawn at the situation corresponding to the inferior termination of *his* posterior flaps, and let the superior boundary of the anterior flap be limited by the same plan. The saving of bone thus effected will be considerable, and therefore tend directly to diminish the mortality

of thigh amputations. According to this method the anterior flap will be shorter by a fourth than Teale's, and there will be no posterior flap." As this proposal appeared to me to be based on sound surgical principles, I determined that I would give it a trial the first opportunity that occurred.

Shortly after this, J. Hoey, aged thirty-four years, by occupation a sailor, was admitted into the Richmond Surgical Hospital on account of very extensive lupoid ulceration of the right leg. It commenced about eight years ago after a fall over a rope, against which the lower part of the leg struck, which he sustained while running along the deck of the vessel during a dark night. Shortly after this, ulceration appeared in the situation where the injury had been received, and commenced to spread extensively.

For some time after his admission into hospital the case was actively treated, both locally and constitutionally, and very considerable improvement took place. So much so, that he was making arrangements to return home, when suddenly a sloughing process supervened, having many of the characters of hospital gangrene. This spread rapidly, engaging the dorsum of the foot, and laying bare the tendons, muscles, and arteries. From the latter, which became ulcerated and opened, very sharp hemorrhage occurred, which was with much difficulty controlled; indeed, it was not satisfactorily arrested until I passed acupressure needles under the vessels, and made pressure on the arteries by passing loops of wire across the needles. The "third method of acupressure" was adopted, and proved in every respect perfectly satisfactory. As the disease spread close to the knee-joint, I did not think it advisable to amputate below the articulation, and I was also deterred from doing so from the fact of the disease attacking the stump, and I did not think either that I could get sufficient healthy integument to cover the broad cut surface of the tibia in front. Behind, I admit, I might possibly have obtained a sufficiency, but I was deterred from making the attempt by a very strong objection which I have to long posterior flaps taken from the calf of the leg. All things considered, I deemed it preferable to amputate above, but as near to the knee-joint as I could, and I have not, I must allow, been disappointed in the result, whether as regards situation of the amputation or the method adopted.

It is unnecessary to enter into any of the minute details, either as regards the operation or the subsequent progress of the case. The former was performed without any deviation from the proposed modification of Teale's amputation, and of the latter, one mishap has to be recorded (though, in truth, it might be adduced as an argument in favour of the operation to those who object to the modification on the grounds of there not

being a sufficiency of flap), and that was, that four or five days after the operation a small portion of the anterior flap sloughed away; but, notwithstanding this, there appears to me to be an ample covering of soft parts on the face of the stump. Now, what are the objections which have been urged by surgeons against the modification?

They are six in number, and may be briefly enumerated as follows:—

1. The cicatrix being too near the face of the stump.
2. Tension of soft parts on the face of stump.
3. Insufficiency of covering.
4. That, owing to retraction of the tissues, the posterior surface of the bone projects, and is denuded of soft tissues.
5. Liability of cicatrix to become adherent to the immediately subjacent bone.
6. Increased risk of pyemia.

As regards the first of these objections, I would remark that it appears to me that instead of the cicatrix being too near the face of the stump, the chances are that, owing to the retraction of the posterior tissues, it will be further away from the face of the stump than in the operation as originally suggested by Mr. Teale. When the posterior tissues are divided they immediately retract, and the retraction does not cease at the time of the operation, but continues during the process of healing—a fact recorded long since by Alanson—and consequently the cicatrix is drawn high up on the posterior surface of the limb. So much, then, for the cicatrix being too near the face of the stump.

The second objection is the liability to tension of the soft parts on the face of stump. This, it has been said, exists in Hoey's case. It may, I confess, be there to a certain extent; but I do not think that it will in any way interfere subsequently with the usefulness of the stump. As regards this point, too, it must be remembered that he had a certain loss of tissue from sloughing of the anterior edge of the flap. Had that not taken place there can be no doubt we should not have had the amount of tension, such as it is, which has been observed.

The result of my case shows also that the third objection, viz, insufficiency of covering, is not a valid one.

The fourth objection is one which Mr. T. Pridgin Teale, the son of the originator of the rectangular flap operation, has made in a letter which he published in the *British Medical Journal* for Nov. 7, 1868. He observes, "if, however, the posterior tissues be divided opposite the point selected for sawing through the bone, they immediately retract to a point higher up, and thus have the posterior surface of the bone projecting and denuded of soft tissues." At first sight this appears a grave objection;

but we need not fear this so much when we reflect "that," as Mr. Lister observes, "it fortunately happens that the bone lies forward among the muscles, so that even its posterior surface is considerably anterior in position to the longitudinal axis of the limb." The tendency is always for the bone to come forward; and if a proof of this were wanting, we have only to bear in mind the fact that in cases where ulceration of the flap takes place, it is in the great majority of cases through the anterior and not through the posterior or lateral position of the stump that the bone protrudes.

Projection and dinudation, therefore, of the bone posteriorly need not, I think, be apprehended.

The remaining objections to the modification—viz., the liability of the cicatrix to become adherent to the immediately subjacent bone, and the increased risk to pyemia, need not, obviously, be dwelt upon.

Such, then, are the advantages of this modification of Teale's amputation, the chief objections which have been raised against it, and the way in which it appears to me they may be best answered. Although I have performed the operation frequently on the dead subject, I have only performed it once on the living.

I should be sorry to advocate this operation in preference to all other methods of amputation of the thigh. This I do not wish to do, for the result of my experience so far, in amputation cases, is in favour of the circular method, for in this, the subsequent chances of pyemia are, I think, diminished, as there is less exposure of soft tissues, and the veins are divided vertically, at right angles to their continuity, and not obliquely, as they are in all flap amputations, which latter must render these vessels more liable to take on inflammatory action, from the wounds in them being necessarily so much greater in extent.—*Dublin Quarterly Journal, Feb.* 1870, *p.* 125.

39.—ON A CASE OF COMPOUND DISLOCATION OF THE ANKLE, WITH OTHER INJURIES; ILLUSTRATING THE ANTISEPTIC SYSTEM OF TREATMENT.

By JOSEPH LISTER, Esq., F.R.S., Professor of Clinical Surgery in the University of Edinburgh.

[A labourer, thirty years of age, had been seriously injured on a railway a few hours before admission to hospital.]

When I saw him, about 8.30 a.m., he was suffering considerably from shock; and he feared, from severe pain which he felt in his chest, that he had received some serious internal injury, an apprehension which has happily proved groundless. I found the left foot much displaced inwards, and the end of the

fibula protruding through a vertical wound in the integument two or three inches in length, the end of the protruding part being comminuted. The tip of the malleolus had been broken off, and remained attached to the external lateral ligament. The internal malleolus was of course fractured, as a necessary condition of such a displacement of the foot. Now, if you were experienced surgeons, you would know that this was a most formidable injury. Recoveries from it were formerly exceptional. Mr. Syme informs me that at one time, on looking into the hospital records, he found that the last fourteen cases of compound dislocation of the ankle admitted into the infirmary had all ended fatally. He therefore came to regard amputation at the ankle as the best treatment in most cases; though he sometimes modified his practice so far as to content himself with removing the end of the tibia, so converting the case into one of excision of the ankle.

In our patient, however, neither of these procedures has been adopted. For the purpose merely of facilitating the return of the protruding end of the fibula, I nipped off a portion of it with cutting pliers, and, with the same object, enlarged slightly with scissors the lower end of the rent in the skin, which opposed a barrier to its passage. But to all intents and purposes the dislocation was simply reduced. The case, however, was treated antiseptically. Watery solution of carbolic acid, as strong as it can be made (one part of the crystals to twenty of water), was thrown into the joint with a syringe, the edges of the skin being held together to prevent its escape and cause its penetration to all the internal recesses of the wound; and this was further promoted by free manipulation of the injured part while the fluid was still in the interior. There was a time when we should have thought that to introduce an irritating liquid like this into the ankle-joint would be to take an unwarrantable liberty with the articulation. But we now understand that the transient irritation caused by the antiseptic lotion is nothing compared with the abiding influence of the far more acrid products of putrefaction. In the operation which you saw me perform just now [the removal of a fatty tumour] a lotion of half the strength (1 to 40) was employed; experience having proved that this is sufficient to ensure destruction of the putrefactive organisms in a wound just made, and made by the surgeon himself. But when the injury has been received some time before you see the patient, and inflicted, as in the present instance, in a rude way, involving the chance of foreign material having been introduced and mixed, perhaps, with clots of blood lying in inaccessible recesses of the wound, it seems wise to employ as strong a solution as water will produce. And as this will be your only chance of acting upon putrefactive particles lodged in the inte-

rior—as the work of their destruction must be done once for all at the outset,—do not be afraid of dealing very freely with the injured part in introducing the germ-poison. [It is a mistake to mingle spirit of wine or glycerine with the watery solution used for injecting the wound. The admixture of either of these materials with water containing a given amount of the acid in solution, gives it a greater hold upon the acid, and renders the lotion more bland, and at the same time more persistent in its action; and this may, under certain circumstances, be very useful for the purpose of an external dressing. But for the preliminary treatment of the interior of the wound an agent potent for the moment, but transient, is called for, to kill the putrefactive organisms, and, as soon as this is done, to leave the wound as speedily as possible to recover from the inevitable irritation of the antiseptic; and for this purpose no vehicle seems better for the acid than simple water.] The liquid introduced having been squeezed out, the process of injection and manipulation was performed a second time for greater security, and the skin in the vicinity having been previously well washed with the lotion, to destroy organisms adhering to it or to the hairs, an external dressing was applied, similar to that which you have seen used after removal of the fatty tumour. Lac plaster was wrapped in two layers round the limb, from three or four inches above the upper extremity of the wound to as far below its lower end—that is to say, extending well up the leg and embracing the heel and instep; the foot meanwhile being held in good position. A cloth, to absorb the blood and serum which would be discharged from beneath the margins of the plaster, was then bandaged on, and a splint applied to the inner aspect of the leg and foot. [The lac plaster has been very much improved of late, by being incorporated with a soft cloth, instead of being spread upon starched calico. It is thus rendered beautifully flexible, and at the same time much more durable, the cloth incorporated with it enabling it to withstand any amount of wear and tear. But, as in this form it is very thin, it is well, where much discharge is anticipated, or when a long time is intended to elapse between the dressings, to use it in two layers, so as to double the store of the acid in the application. (This plaster in its best form may be obtained from the old Apothecaries' Company, Virginia-street, Glasgow.)]

But the compound dislocation of the ankle was not the only injury which this poor man received. Observing some blood about his hair, I examined the head, and found four scalp wounds, varying in length from two to five inches, three of them exposing the bone, into which black dirt had been ground—probably, as he suggests, by the fire-pan of the engine. We used to reckon that when the bone was thus extensively ex-

posed in a scalp wound, and subjected at the same time to such violence, the cure was pretty sure to prove tedious, protracted by the exfoliation of osseous scales of greater or less thickness. There was at the same time more or less risk of head symptoms or of erysipelas. It is, therefore, very satisfactory in such cases to be able to reckon on primary union under antiseptic management. The region occupied by the wounds being extensive, the greater part of the scalp was shaved, and thoroughly washed with the strong antiseptic lotion; and the wounds were treated just like that at the ankle, except that their edges were approximated by antiseptic sutures. [The material which I have used of late for this purpose is silk steeped for a while in a mixture of melted bees'-wax, with a certain proportion of carbolic acid—say a tenth part. As the silk is taken out of the hot liquid, it is drawn through a dry cloth to remove the superfluous wax; after which it may be wound on a reel, and kept in any close vessel. The wax, besides giving the knot a better hold, prevents the antiseptic from being washed out of the thread, and also, filling up the interstices of the fibres, renders the silk incapable of imbibing stimulating liquids; and so confers an unirritating quality corresponding to that of the metallic suture, over which the suppleness of the thread gives it a great superiority.] When all had been stitched up, each wound was once more injected with the strong watery solution, to correct any mischief that might possibly have been introduced by regurgitation of blood that had oozed into the cavity during the insertion of the stitches. A well overlapping cap of lac plaster, in double layer, was then applied, surrounded by a cloth to absorb discharge, secured by bandage and pins. I cannot too strongly impress upon you the importance of having the plaster extend freely beyond the wound at every part, so that the discharge may have to travel a considerable distance beneath the impermeable antiseptic layer before reaching the sources of mischief externally. It is only in this way that you can guard securely against the spread of the putrefactive fermentation into the wound. Yet there is nothing in the antiseptic treatment that I find more apt to be neglected.

After I had left the patient, Dr. Cleaver [the house-surgeon] discovered a compound fracture of the right olecranon. The patient thinks he must have fallen upon his elbow; and in this he is no doubt correct, the fracture having been thus caused by direct violence. The wound was not large; but, from the relations of the bone, it necessarily communicated with the articulation. Here, then, was another injury, in itself sufficiently serious—a compound fracture into the elbow joint. This Dr. Cleaver treated in a manner similar to that in which I had

dressed the ankle, and applied an anterior splint to maintain extension of the elbow.

Now I do not hesitate to say that if our antiseptic means succeed as such—that is to say, if putrefaction is prevented from occurring in the wounds—neither of these severe injuries, the compound dislocation of the ankle, the compound fracture into the elbow-joint, nor the scalp wounds exposing and injuring the bone, will occasion either local or constitutional disturbance. You may perhaps think me bold to speak in this confident way at so early a period of the case, at the beginning of the fourth day, the very time when, under ordinary treatment, the region of the ankle would be red, swollen, and painful, preliminary to suppuration, and the pulse rising, with other indications of increasing fever. But the progress of the patient already goes far to justify me. All the injured parts are as yet in a perfectly quiet state, his pulse is daily descending, his tongue is clean and moist, and he relishes his food, and complains of no pain whatever, except that of the contusions of his chest and shoulder. *You* cannot suspect me of exaggeration, for you have only to go to the patient's bed and inquire for yourselves; and any of you who are disposed to witness the dressing will see it done to-morrow at the visit hour.

But besides the favourable condition of this patient hitherto I have ample experience to found upon. Since my attention was first drawn to antiseptic surgery I have been concerned in four other cases of compound dislocation of the ankle. One of them was treated in the Glasgow Infirmary just before I left it. The displacement of the foot was inwards, as in our patient, though produced in a very different way. (See *Lancet*, Jan. 1, 1870.) The treatment also was the same; and the wound, which was large, became a superficial sore, without suppuration or any local or constitutional disturbance.

Another of the cases was also a dislocation inwards, caused by a lady being thrown out of a dog-cart. She was not under my care, but I was in so far concerned in the treatment that the son of her medical attendent (Dr. Coats, of Glasgow) being at that time one of my dressers, he was asked by his father to employ the means which he had seen me use at the hospital. In accordance with my practice at that time, an oily solution of carbolic acid was introduced into the joint and into the rest of the wound, and a layer of putty, rendered antiseptic by the admixture of a certain proportion of the acid, was used for the external dressing. The means were different, but their object was the same. The oily solution destroyed organisms existing in the wound; and the putty, like the lac plaster, impermeable to watery fluid, communicated the volatile antiseptic stored up in its substance to the discharge that flowed out beneath it.

The case was published by Dr. Coats, who told how, after the first smarting caused by the acid had subsided, the patient was free from the pain previously experienced, and never after had any uneasiness in the part. Here also the wound closed without any deep-seated suppuration or any febrile disturbance.

In a third case, a gentleman about sixty years of age, of heavy frame, slipped in going down stairs, and the foot was driven forcibly outwards, the fibula being broken, while the internal malleolus was thrust through the integument. I saw the patient in conjunction with Dr. Geo. Buchanan, of Glasgow; and Mr. Berkeley Hill, of London, happening to be on a visit to me at the time, witnessed the first dressing. The lac plaster was used, but in a way which I have since abandoned, so that I need not trouble you with its details. [After the joint had been injected with watery solution of carbolic acid, and the dislocation reduced, a bit of block tin was placed over the wound to protect it from the stimulating action of the acid in the plaster wrapped round the foot. This was surrounded with a cloth and bandage, which were afterwards daily touched with a strong solution of carbolic acid in oil, to renew a supply of the antiseptic to the lac beneath, which was permanently retained. The tin has since been superseded; and I have found it, on the whole, better to change the entire dressings occasionally, in the manner to be described in the sequel.] Though the patient was of gouty habit, and in other ways by no means a very favourable subject, his progress was all that could have been desired had the case been one of simple fracture. [Not one drop of pus appeared till, five weeks having elapsed, and a little serous discharge still continuing, the deeper dressings were removed for the first time, and disclosed a superficial sore with pouting granulations, which healed in a few days under an astringent lotion.]

The fourth case was one in which the injury was inflicted by myself, but was of the same essential nature as those caused accidentally, though its effect was to remedy, not to produce, displacement. The foot had been driven backwards and outwards by the violence which occasioned a simple fracture of the fibula and internal malleolus four months before; and the faulty position having continued during the union of the fragments, the limb was perfectly useless, and the patient, a young man of twenty-nine, had the prospect of going on crutches for the rest of his life. Relying on our antiseptic means, I did not scruple to divide with pliers the callus of both tibia and fibula, though I knew that in so doing I was opening into the ankle-joint. For the case differed in this important particular from those which result from accident, that I could guard with certainty against the introduction of putrefactive mischief while

making the wounds; whereas in the accidental cases we cannot help feeling a degree of uncertainty till the first few days are over whether the organisms introduced before we see the patient have been all destroyed, though in truth the method by injection and manipulation which I have described seems to have reduced this to something very nearly approaching certainty. The foot having been drawn forcibly into its proper position by means of pulleys, and retained by appropriate splints, while an external antiseptic dressing was employed on the same principle as the putty and lac plaster, though of different materials, the wounds became superficial without suppuration and without the slightest inflammation or fever; and I have the satisfaction of knowing that he, like the other patients, has now a sound and useful foot.

The dressings were changed entirely on the day after the accident. [In doing this the greatest care is requisite. For the antiseptic injected into the wound on the previous day having been absorbed into the circulation, the extravasated blood, and any portions of tissue killed by the violence of the injury, are as susceptible of putrefaction as if no such treatment had been pursued; and my experience leads me to believe that if, when the dressings are removed, a single drop of serum were to be pressed out by the movements of the limb and then regurgitate into the interior, after being exposed even for a second to the influence of septic air, putrefaction would be pretty certain to occur. The skill required to guard against this risk during the first few days, before the wound has consolidated, used to be a serious drawback to the treatment. But the difficulty and uncertainty arising from this cause have been changed to facility and security by a most simple means—the employment of a syringe, the nozzle of which is inserted beneath the margin of the lac plaster, and, as this is raised, a stream of weak watery solution of carbolic acid (1 to 40) is made to play upon the wound till a piece of calico, soaked with the same lotion, has been placed upon it by an assistant, as a temporary security until the plaster is reapplied. Any examination of the wound that may be desired is made with freedom through the transparent solution thrown over it by the syringe, the wound being never left for an instant without an antiseptic guard. The cloths outside the lac plaster adhere to its edges through drying of the discharges which they absorb, and care must be taken in removing them to hold the plaster down over the region of the wound, so that it may not be, even for a moment, dragged up along with them. These details, while essential to success, are happily, easy of execution.]

The dressing on the day after the accident and subsequently has differed from that used in the first instance in this respect,

that, before applying the lac plaster, the wound itself was covered with a layer of material designed to protect it from the stimulating and irritating influence of the carbolic acid in the antiseptic stratum. You have often seen this "protective" in use in other cases, but I desire now to direct your attention to it more particularly.

Of all those who use antiseptics in surgery, I suspect that I apply them least to the surface of the wound. After the first dressing, the object which I always aim at is to have the material in contact with the exposed tissues approximate as closely as possible to the perfectly bland and neutral characters of the healthy living textures. If you consider the circumstances of a simple fracture, which you cannot too often call to mind if you wish to keep your ideas clear and right upon this subject,—if you remember how the severe contused internal wound, with the interstices of the mangled tissues loaded with extravasated blood, recovers quickly and surely under the protection of the unbroken integument, it is plain that all that is required in an external wound is to guard it against the disturbing influence of external agency. The injured tissues do not need to be "stimulated" or treated with any mysterious "specific"; ALL THAT THEY NEED IS, TO BE LET ALONE. Nature will then take care of them: those which are weakened will recover, and those which have been deprived of vitality by the injury will serve as pabulum for their living neighbours. Now, of all external agencies the most injurious by far is putrefaction, and this, above all, we endeavour to exclude. But a substance employed with this object, if sufficiently potent to destroy the life of the putrefactive organisms, cannot fail to be abnormally stimulating to the exposed tissues; and these must be protected from its action if the wound is to progress exactly like a subcutaneous injury.

Our "protective," then, should be a material unstimulating in its own substance, and impervious to carbolic acid. At the same time it must be insoluble in the discharges, and sufficiently supple to apply itself readily to the part. But it is by no means easy to find anything fulfilling all these conditions. Gutta percha or caoutchouc, which naturally suggest themselves, transmit the acid from particle to particle of their substance with the utmost facility, and are utterly useless for this object. A metallic plate is quite impervious to the acid. But thin block tin, which I once used, is too rigid, while tin-foil soon wears into holes. I have been lately trying a microscopically thin layer of metal, in the form in which you see it in this specimen. Cotton cloth, coated on one side with caoutchouc, is gilded on the caoutchouc side, and then covered with a film of india-rubber applied in solution. We have ascertained that the gold-leaf thus enclosed between two layers of caoutchouc spread on cloth

wears thoroughly well; and, if I can get a manufacturer to enter into the thing, I have hopes of obtaining at last something like a perfect protective. And when this is attained, as the lac plaster is quite trustworthy for excluding putrefaction, our treatment will yield to the full the beautiful results which theory indicates as possible.

There is one more point that must be mentioned with reference to the protective. It is essential that it should be itself antiseptic at the moment of its application, otherwise there would be a risk of its communicating septic particles. This object can be attained by covering it with an extremely thin film of some material soluble in water; so that when dipped into a watery solution of the acid it may be uniformly moistened with the antiseptic, but in so small a quantity as will be rapidly absorbed by the wound and by the skin, so as not to interfere to any material extent with the purely protective office of the application. You will bear in mind that the protective is not designed to have any persistent antiseptic virtue; and that, like the wound at the first dressing, it must be freely overlapped at every point by the antiseptic plaster.

These principles will be found to apply whatever be the materials used for carrying out the antiseptic system. An antiseptic to exclude putrefaction, with a protective to exclude the antiseptic, will by their joint action keep the wound free from abnormal stimulus.

Though we have not yet got a perfect protective, that which we are now generally using answers very fairly, and has this advantage—that the materials for it can be obtained from any druggist's shop. The basis of it is the common oiled silk. I am indebted to my late house-surgeon, Dr. Joseph Coats, now pathologist to the Glasgow Royal Infirmary, for calling my attention to the fact that carbolic acid does not pass nearly so readily through oiled silk as through gutta-percha. But if oiled silk is dipped into a carbolic lotion before applying it, the watery fluid runs from the surface as from a duck's back, and there is risk of septic particles being deposited upon the dry parts, even during the rapid transfer from the vessel containing the lotion to the wound. I had reason to suspect that, in some cases of hollow wounds, putrefaction was actually brought about from this cause; and hence I was induced to abandon the oiled silk for a while. But of late I have had it coated with a soluble film, which entirely removes this objection. The oiled silk is brushed over with a mixture of one part of dextrine, two parts of powdered starch, and sixteen parts of cold watery solution of carbolic acid (one to twenty). The carbolic acid solution is used rather than water, not for its antiseptic property, but because it makes the dextrine apply

itself more readily to the oiled silk, and the granular starch is used for a similar purpose. The carbolic acid may be afterwards allowed to fly off without disadvantage; so that there is no need for keeping the protective, like the antiseptic plaster, in a close vessel. Oiled silk thus prepared becomes uniformly moistened when dipped in a watery solution of the acid, so that all risk of communicating putrefactive mischief along with it is avoided; and if it be used in two layers, it opposes a pretty effectual barrier to carbolic acid, as is sufficiently illustrated by the progress of the present case.

On the day after the accident the cloths around the lac plaster applied to the ankle, and even the pasteboard splint and its padding, were found soaked with bloody discharge. On the second day, when the dressings were again changed, the cloths presented only a stain corresponding to a few drachms of tinged serum; so that I thought it safe to allow two days to pass before the next dressing. I believe it to be best in all cases to change everything on the day following the injury; because the effusion from the wound is then of a bloody character, and though the lac plaster certainly sheds the discharge admirably, yet it is possible that a layer of clot may be lying beneath it, which might interfere with its antiseptic operation. But after the first day, sanguineous effusion having ceased, the interval between the times of dressing should be regulated by the amount of discharge to be anticipated; for the more copious it is, the sooner does it exhaust the carbolic acid in the plaster. The lac may happily be always trusted to retain enough of the acid for twenty-four hours, however free the discharge may be. If the stain on the cloths indicates an effusion of only a few drachms, the plaster may be safely left for two days. If the serous oozing be not more than a few minims, the interval may be extended in proportion to the smallness of the amount, till finally, when, as sometimes happens, the plaster is maintained as a precautionary measure though no discharge is present, it may be left for a week without losing its antiseptic virtue. When the interval between the dressings is thus prolonged, the pains taken during the first few days are rewarded by great saving of trouble, as well as by the satisfactory progress of the patient; and when the case is one of fracture, the avoidance of frequent disturbance of the apparatus is of course a matter of most material consequence.

At the next dressing, four days after the accident, the ankle presented an appearance which would have been impossible without antiseptic management. The hollow wound, about three inches long, and gaping about an inch, was still occupied by the original coagulum on a level with the surrounding skin; while the discharge of the last two days had caused only a serous

stain of a few minims on the cloths. But this state of things was not merely the result of *antiseptic* treatment. It implied that our *protective*, also, was answering its purpose well. Had the antiseptic been acting directly on the wound, the discharge would have been much more considerable, and we should probably have already had a hollow sore with commencing suppuration. Here I cannot help observing that it seems to me strange that some who have not scrupled to criticise me with great severity should have taken so little trouble to ascertain what I have written on this subject. From the remarks made by some persons, you would imagine that I regard putrefaction as the sole cause of suppuration; whereas my treatment of abscess depends essentially upon the fact that the pus in the unopened cavity, being the result of the inflammatory stimulus without atmospheric influence, is free from putrefaction, so that it is needless to apply the antiseptic to the interior, all that is requisite being to provide exit for the discharge while guarding against the entrance of putrefactive fermentation. Again, from the statements of others you would suppose me to have taught that, if you do but apply carbolic acid freely to a wound, you will prevent suppuration; whereas I have all along pointed out that carbolic acid, being a stimulating substance, will itself induce suppuration by long-continued action on the tissues.

[The facts observed in developing the antiseptic system have thrown great light upon the causes which determine the occurrence of suppuration, and the subject is of such great practical importance that it may be well to take this opportunity of giving definite expression to the conclusions to which I have been led. It fell to my lot several years ago to establish, as the result of an experimental inquiry, that the tissues of the living body are liable to a temporary impairment or suspension of vital energy as the result of extreme irritation; and that this condition, which appears to be the essence of *intense* inflammation, may be brought about in two totally distinct ways—viz., either by the direct operation of a noxious agent upon the tissues, or indirectly through the medium of the nervous system. The same law appears to hold with regard to the causes of the exaggerated but feeble cell-development which results from the continued action on the tissues of some abnormal stimulus in a less intense form, giving rise, according to its degree, to the various phenomena of inflammatory hypertrophy, granulation, and suppuration; the pus-cells being the extreme of excess of quantity and impairment of quality in the product of abnormally excited nutrition. Thus the causes of suppuration divide themselves into two great groups: first, those that operate through the nervous system, or, in other words, the inflammatory class, of which the common abscess presents a typical ex-

ample; and, secondly, noxious agents or stimuli acting directly on the tissues. The latter group are, practically speaking, stimulating salts, or chemical stimuli. These are best studied in the behaviour of a healing ulcer under different kinds of treatment. Small granulating sores sometimes heal by scabbing; and when the surface is thus protected by a crust of dried discharge from the influence of external agency, there is no further effusion either of pus or serum. This is of itself sufficient evidence that granulations have no inherent tendency to form pus (or, as is sometimes absurdly said, to *secrete* it), but only do so when stimulated. The same thing is equally clearly shown by the well-known fact that two granulating surfaces will coalesce when placed in contact with each other. This coalescence would be impossible if they continued to suppurate; and their juxtaposition could oppose no obstacle to pus-formation if they had any innate disposition to it. But their mutual contact excludes the operation of external agents upon them; being freed from stimulation, they cease to discharge, and are then at liberty to coalesce. New examples of the same truth present themselves under the antiseptic system of treatment. The wall of an abscess is similar in nature to the granulations of a sore, and is often regarded as essentially "pyogenic." But if the abscess is opened antiseptically, the pyogenic membrane, being relieved from the inflammatory stimulus which the tension of the pus before induced, and being at the same time protected from the access of the stimulus of putrefaction, is left free from all disturbance, and never forms another drop of pus. But the most striking illustration I ever saw of the properties of granulations, when not subjected to stimulation, was presented by a case of compound fracture, in which an extensive portion of the shaft of the tibia had lost its vitality, and lay exposed in a large granulating sore. The granulations grew up and enclosed the dead bone, which, being prevented from putrefaction by the treatment employed, was destitute of the usual acrid properties of an exfoliation, so that the granulations, being not stimulated by it, not only formed no pus from the surface in contact with it, but gradually consumed the dead mass by absorption.

The truth is, that so far from granulations having any inherent tendency to form pus-corpuscles, the imperfect tissue of which they consist is ever disposed to develop into higher forms as soon as it is left free from preternatural excitement. This is beautifully illustrated by the familiar phenomena of the healing ulcer. The granulations are still granulations—that is to say, possess still the same pathological structure, when covered by the pellicle of newly-formed epidermis at the edge of the sore, as when they were exposed. But no sooner does the film of young epithelium protect the imperfect tissue from the influence

of external stimulus than the rudimentary structure of the granulations immediately proceeds to develop into the more and more perfect fibrous tissue of the cicatrix.

It being, then, clearly understood that granulations form pus only when abnormally stimulated, we are in a position to estimate the effects of different agents upon them. The simplest case is when an antiseptic substance, like chloride of zinc or carbolic acid, is applied, suitably diluted, to a healthy granulating sore. Not the slightest redness of the surrounding skin, or any other indication of inflammatory disturbance, is produced; yet the granulations, so far as they are exposed to the influence of the stimulating liquid, are excited to superficial suppuration, but form no pus where they are protected from the stimulus by the pellicle of epidermis at the margin. Here, then, we have entire absence of the inflammatory stimulus; but the chemical stimulus of the pungent antiseptic salt urges the superficial cells of the granulations to develop pus-corpuscles.

If the sore is treated with water-dressing, the serum first exuded putrefies in the lint, and the products of putrefaction, being acrid salts, cannot fail to stimulate the surface of the granulations; and accordingly superficial suppuration is induced without any appearance of inflammation, just as under the influence of the antiseptic. Thus, in their effects upon a granulating sore, an antiseptic and a putrid dressing are alike: both excite superficial suppuration by direct chemical stimulation of the granulations. But in their operation on a recent wound there is this all-important difference between them, that the antiseptic stimulates only the surface to which it is applied, and every drop of discharge which it induces dilutes it and renders it less stimulating; but putrefaction being a fermentation, the self-propagating ferment spreads throughout all the recesses of the wound, wherever extravasated blood, or serum, or portions of dead tissue afford nidus and pabulum for its development, and its products become more and more acrid the longer it continues in operation. Antiseptics, then, though they do produce suppuration when applied continuously to a recent wound, are superficial in their action and utterly trivial compared with the deep and virulent effects of putrefaction, which, indeed, often causes death by irritation and blood-poisoning before suppuration has had time to be established.

These conclusions may be exhibited in a diagrammatic form as follows:—

Causes of Suppuration.

Abnormal stimulation of the tissues,	A	Through excited nervous action.	*Inflammatory.*
	B	From the direct action of stimulating salts.	*a. Putrefactive.* *b. Antiseptic.*

This scheme, though not strictly exhaustive, applies to almost all circumstances met with in surgery; and it will be found to conduce to clearness to speak of suppuration as inflammatory, putrefactive, or antiseptic, according to the circumstances in which it occurs.]

If the use of the protective be so advantageous, you may naturally inquire why I did not employ it at the first dressing. The reason is twofold. In the first place, there must necessarily be a considerable discharge of blood and serum during the first twenty-four hours, and hence this is the period in which there is greatest risk of putrefaction spreading into the wound, so that it does not seem wise to interpose anything that can interfere in the slightest degree with the antiseptic action of the dressing. And, in the second place, there is no chance of a suppurating sore being established by the direct action of the antiseptic upon the wound for a single day only. This leads me to speak of a condition of suppuration to which I have not before had occasion to advert—viz., the element of *time*. When the tissues are in a healthy state, no stimulus can induce them to suppurate. It appears that it is only when the tissues have been gradually degraded, under the influence of protracted abnormal stimulation, into the most imperfect of all tissues, which, when we see it at the surface of a sore, we term granulations, that they are in a condition, if further stimulated, to give birth to the still lower progeny of pus-corpuscles. In other words, granulation must precede suppuration, and it is a process which occupies days for its completion. Thus it is a familiar fact to all surgeons that a recent wound in healthy tissues does not suppurate for three or four days when subjected to ordinary treatment—that is to say, the stimulus of putrefying material must act for three or four days upon the tissues before it can induce them to suppurate; and when the first-formed pus is wiped from the wound, granulations may be seen upon the surface.

The same holds with regards to the inflammatory stimulus. Inflammation does not produce suppuration in a day. Whether acute or chronic, it must first degrade the tissues to granulations before it can occasion the formation of pus. This is well illustrated by a common boil, which is a limited inflammation of the cutis vera, so severe at the centre as to destroy the vitality of a portion of the tissue, and gradually shading off to the state of health in the vicinity. Here, though all possible degrees of intensity of inflammation are present between the centre and the circumference, no pus is produced till some days have elapsed. Then the "core separates," as it is said, and the slough is found detached from the neighbouring living tissues, and surrounded by a few drops of odourless pus. But when the slough and the pus are removed, the cavity in which they

lay is seen to be lined with granulations. The inflammatory stimulus, like the putrefactive, had induced granulation as a preliminary to suppuration.

In the same way, an antiseptic must act for days upon a wound before it can convert it into a granulating sore liable to suppuration; so that no harm is done by omitting the protective for the first twenty-four hours.

The other injuries in our patient have thus far proceeded as satisfactorily as that of the ankle. The four severe scalp wounds were dressed on the day after the accident, and each was covered with protective before the cap of the lac plaster was reapplied. On the following day, the discharge to be seen on the cloth round the lac was so slight that I thought it safe to leave the head undisturbed for another day. The second dressing was witnessed by some of you just after last lecture. The discharge of the two days amounted to only a few minims of serum, and there was entire absence of redness, puffiness, or tenderness of the scalp. I removed the numerous sutures, each coming out as clean as when it was introduced; and all the wounds seemed already completely healed, except a small superficial raw surface here and there.

[Before proceeding to relate the further progress of the case, Mr. Lister directs attention to a point which he considers as of great practical importance in the injury to the ankle. The day after the accident it became apparent that the vitality of portions of the integument was destroyed both at the anterior margin of the wound, and in detached patches at the outer aspect of the dorsum of the foot.]

Now, if any one of these dead pieces of skin had been left exposed to atmospheric influence, it would have putrefied; and the putrefaction would in all probability have spread along the extravasated blood and serum in the subcutaneous tissue till it had reached the seat of fracture and the articulation, and all our antiseptic treatment of the wound would have proved nugatory. I once saw a case of compound fracture of the forearm in which the antiseptic treatment had been pursued with thoroughly efficient means, but after the lapse of some days I was asked to look at the limb in consequence of unsatisfactory appearances. I found the dressings applied perfectly correctly, and I had no reason to doubt that they had been so from the first; but the wound, when exposed, emitted an offensive discharge. On investigation I found a small slough of the skin, about half an inch in diameter, situated some inches from the wound, and just beyond the limits to which the lac plaster had been extended. The little slough had by this time undergone softening from putrefaction, so that the nozzle of a syringe

could be introduced through it; and, on injecting some of the watery solution of carbolic acid, I found that it passed freely beneath the integument to the seat of fracture and to the external wound. Whether the skin had been thus extensively detached at the time of the accident, or whether the subcutaneous tissue had been simply loaded with extravasated blood, the spreading of the putrefactive fermentation from the slough exposed to the air was easily intelligible.

It is therefore essential that every isolated slough which may exist in the vicinity of a contused wound should be dressed antiseptically like the wound itself. But it may be asked, how is it possible to secure this at the time of the first dressing, seeing that there is nothing in the appearance of the skin in the first instance to indicate that vitality has been destroyed? The simple rule for attaining the desired object is to let the antiseptic plaster first applied overlap the apparently uninjured skin far and wide in all directions. Then, on the following day, let the integument be carefully scrutinised, when any dead portions will be recognised by a dusky discoloration. Every such discoloured patch should then be dressed, as if it were a wound, with a piece of protective and well-overlapping lac plaster. If the protective were omitted, the slough would acquire stimulating properties from the carbolic acid perpetually communicated to it by the lac plaster, and would excite the neighbouring living parts to granulation and "antiseptic suppuration." But if efficiently protected from the antiseptic, as well as from putrefaction, the dead tissues will be absorbed and organised like the clots of blood, new living structures being formed at the expense of the effete but nutritious mass.

Such was the course pursued in the present case; and, the oiled silk protective having been used in two, and sometimes three, layers, the results have approached very closely to those which are theoretically attainable. Some of the smaller portions of slough have been entirely removed by absorption, their place being taken by vascular new tissue. Five weeks after the accident, the large slough at the anterior margin of the wound had been considerably reduced in superficial extent, without the formation of any line of separation. What remained of it was of firm consistence, though of yellowish-white colour. In order to ascertain to what extent the process of organisation and vascularisation had advanced in it, I scratched its central part with the point of a sharp knife, and found that the little incision bled when I reached a depth not above half that of the cutis vera, whereas the original slough had undoubtedly involved, not only the entire cutis, but the subcutaneous fat. The mass of dead tissue, though superficially situated, being protected from the disturbing influence of external agency, was undergoing the

same kind of change as is experienced by parts deprived of vitality in the subcutaneous injury of a simple fracture.

The appearances of the wound itself presented an equally striking difference from those met with under ordinary treatment. Even at this late period, five weeks after the accident, the original clot was still to be seen, of an orange-brown colour, on a level with the surrounding skin, but greatly diminished by contraction and also by cicatrisation, epidermic formation having advanced considerably from all parts of the margin of the wound, except anteriorly, where the slough was present. An open sore healing by cicatrisation without suppuration, or even granulation, is something new in the history of surgery, though exactly what might have been expected from what we know of healing by scabbing. At the lower extremity of the wound the new and vascular tissue which had been formed by organisation of the clot was slightly more prominent than the rest, and had somewhat the characters of granulations covered with epidermis. But not a trace of pus had been produced. On the occasion when these observations were made, eight days had been allowed to pass since the last dressing, and in order to estimate accurately the quantity and quality of the discharge, I removed the lac plaster without injecting any watery solution beneath it, knowing that at this late period no risk would be incurred by free exposure of the wound. The bandage outside the plaster being free from stain, the whole discharge of eight days had accumulated beneath the impermeable layer of lac, and consisted only of about two minims of white but thin fluid, together with some desquamated epidermis. I subjected the milky liquid to microscopic examination, and found that the opaque element was composed exclusively of epidermic scales.

The vascularisation of the clot, like that of the sloughs, had been advancing from below as well as round the margins. Fifteen days after the accident I cut into the central part of the then chocolate-coloured coagulum, under the protection of a stream of watery solution of carbolic acid, and found that it did not bleed, though the knife penetrated about a quarter of an inch. But on a repetition of the experiment twelve days later, blood oozed up from an incision carried to only about the depth of an eighth of an inch.

The process of organisation of clots and sloughs thus observed in an external wound, though of the same essential nature as that which occurs in subcutaneous injuries, was undoubtedly retarded by a certain degree of abnormal stimulation inseparable from the method of treatment. For, besides the fact that the protective was not perfect—*i.e.*, not absolutely impermeable to the carbolic acid furnished by the lac plaster,—the clot and sloughs were more or less soaked with the antiseptic lotion

every time the dressings were changed; and though the acid is soon diffused and carried away by the circulation, this circumstance necessarily operated as a disturbing cause. Hence the rate of healing will be more rapid in proportion to the efficiency of the protective, and also to the length of the intervals that can be allowed to pass between the dressings consistently with security against putrefaction. In the present case the period between the dressings was extended as the discharge diminished, and it may be worth while to mention the successive intervals. From the date of the accident they were as follows: one day; one day; two days; three days; three days; five days; five days; seven days; and finally eight days; bringing the time up to five weeks from the receipt of the injury. But I am not prepared to recommend a longer time than a week, and even that only when the discharge is practically *nil*. Indeed, in our patient, putrefaction did take place in the period following that of eight days. I had intended allowing another week to pass before meddling with the limb, but at the close of the sixth day my house-surgeon informed me that the patient had got up two days before, without leave, and had made his way, on chairs as crutches, to the fire, a distance of several yards; and, further, that there was an appearance of a stain upon the bandage. I therefore exposed the limb, and found that the discharge was considerably greater (amounting to perhaps half a drachm), fetid, and, for the first time since the accident, unmistakably puriform. The dressings removed on the last occasion had been perfectly odourless; and the most probable explanation seemed to be, that the vascular engorgement of the limb occasioned by the dependent posture had induced an unusual exudation of serum from the wound, and that this circumstance, combined perhaps with some movements of the foot, had proved too much for the antiseptic power of the lac plaster at that period after its application. Happily the occurrence was of no consequence, as the wound was practically superficial, and beyond the reach of danger from putrefaction. But it may serve as a warning. And it must ever be borne in mind that, in the earlier stages of such a case as this, where the avoidance of putrefaction may be a matter of life and death, it is better to err on the side of dressing too often, rather than too seldom.

The putrefaction had evidently occurred quite recently, for the clot and sloughs were not yet detached. I clipped away most of the slough, and scraped off the clot till I got down to bleeding tissue, and, with the view of correcting the putrefaction in such portions of dead material as remained, I treated the sore with a strong solution of carbolic acid in spirit of wine (one part to five), and, having washed the skin around with watery solution, applied lac plaster, omitting the protective.

Next day, however, the putrefaction was reproduced; showing that the antiseptic employed had not thoroughly penetrated the adhering portions of slough. Having at hand some saturated solution of chlorine gas in water (the liquor chlori of the British Pharmacopœia), I applied it freely to the sore and also to the surrounding integument, and then dressed with protective dipped in chlorine water and covered with overlapping lac, as formerly. On the following day the sore was destitute of odour of any kind, while the discharge was greatly reduced. For the future it will be treated as a superficial ulcer.

With regard to the injury to the ankle, it only remains to be mentioned that at the present time, six weeks after the accident, the fracture of the internal malleolus has united firmly, and the foot is in good position; while the patient can already move the ankle-joint through a considerable angle.

The four severe scalp wounds—three of which, it will be remembered, involved exposure and injury of the bone—healed completely, without the formation of a drop of pus. And it was an interesting circumstance that, on the removal of some scabs, one of the silk sutures, which had been accidently left, was found still securely in its place, three weeks after its introduction, and came away clean and dry, like a metallic stitch.

The compound fracture into the elbow-joint also healed without any suppuration. Five weeks after the receipt of the injury the splint was removed. The broken olecranon was found firmly united, and the patient has now free motion of the articulation. —*Lancet, March* 19, 26, *and April* 9, 1870, *pp.* 404, 440, 512.

40.—ON THE USE OF CARBOLIC ACID IN COMPOUND FRACTURES, WOUNDS, AND BURNS.

By EDWIN P. GUTTERIDGE, Esq., Maldon, Essex.

Thinking that the carbolic acid treatment of compound fractures, &c. is not generally adopted, I venture to send the following cases which have occurred in my practice during the last few months, to bear testimony to the wonderful effects produced by this valuable remedy, feeling sure that when once fairly tried and properly carried out, no medical man would go back to the old system of treating compound fractures, and if success does not follow, it arises in most cases from improper management. The following is the plan that I have pursued:—

1st. Having reduced the fracture, I introduced pure carbolic acid into all accessible recesses of the wound. I prefer doing this by means of a piece of lint, held in dressing forceps, and dipped in the liquid large enough to overlap the sound skin, as the caustic action of the carbolic acid has a stimulating influence, and excoriates the skin.

Having prepared carbolic oil, consisting of one part of carbolic acid and four parts of boiled linseed oil, I soak a piece of lint, folded three or four times thick, in it, and place it over the wound, the size of the lint being about three inches square, and over this a piece of sheet-lead doubled, rather smaller than the lint, and having straightened the limb, place it in splints. Sheet-lead is superior and preferable to block tin (which is advised to be used by some), on account of the facility with which it can be moulded to any shape that is desired.

For the next three weeks, every day, I pour carbolic oil on the edges of the lint, so that it is kept constantly wet.

If every thing goes on well, I do not disturb the dressing for five or six weeks, when, on taking it off, I find the wound either perfectly healed, or merely a superficial granulating sore with prominent granulations, which require daily for a short time to be touched with sulphate of copper, under which the wound very soon heals.

Since treating compound fractures in this manner, I have never found my patients suffer from any severe constitutional disturbances: the system receives no shock from the accident; no fever follows; the pulse keeps low, never rising above 84 per minute; the appetite remains good, the tongue clean; and there is no formation of pus. In fact, with carbolic acid, compound fractures are rendered simple to the surgeon, and the patient rapidly improves.

Case 1.—David P., higgler, aged 45, on the 6th February, 1868, was thrown out of a cart, and sustained a severe compound fracture of the right leg, the upper fragment of the tibia protruding an inch on the inner aspect. The fracture could not be reduced without enlarging the wound and sawing off the protruding portion of the bone. Afterwards the leg was put up as above described, and in Cline's splints. During the first twelve hours there was considerable hemorrhage, but after that time it ceased. Everything went on well, with the exception that the patient suffered much pain at the seat of injury. At the end of five weeks, on taking off the dressing, the wound was found completely healed.

Case 2.—Henry H., aged 14, on September 3rd, 1868, fell off a horse. Compound fracture of the left leg; the wound small, on the inner side; no bone protruding. He was treated in the same way. Had no bad symptoms of any kind, and did well. At the end of six weeks the wound was perfectly cicatrised.

Case 3.—Henry S., aged 10, on October 19th, 1868, was thrown from a horse. Compound fracture of the right femur, with laceration of the artery profunda femoris; wound on the outer aspect. The bone did not protrude; but the limb was so distorted and distended from extravasation of blood, that from

above the knee it looked like a large ball. The leg was very cold; and the boy was much prostrated by the shock of the accident, as well as by the hemorrhage—so much so that it was uncertain whether the limb could be saved. It was merely tied up in a pillow, and the carbolic oil applied as above. On the following day the leg had become warmer; and the boy went on so well that after six days I straightened the leg and applied a long splint, bandaging up only as far as the knee-joint, applying the usual perineal bandage, &c. Six weeks after the accident I took the dressing off, but allowed the splint to remain on for another week. I found a superficial sore, with fungous granulations, the size of a shilling. Applied sulphate of copper daily, and dressed with calamine ointment; and after seventeen days the wound healed. During the whole time the child did well in every way, except that he suffered pain during the first fortnight.

Case 4.—George H., aged 18, a painter, on Jan. 14th, 1869, whilst at his work on a ladder, it slipped from under him, and his right leg was caught between the spokes. He sustained a compound fracture of the tibia, the wound on the outside of the leg being sufficiently large to admit the tip of my index-finger. Treated as above. Serous discharge for forty-eight hours from beneath the dressing; but every thing went on well, with the exception of great pain at the seat of fracture. At the end of five weeks the wound had healed, a few granulations only requiring a week's attention with sulphate of copper.

Case 5.—William M., aged 29, an engine-driver on the Great Eastern Railway. On June 15th, 1869, the 8 p.m. train from Witham to Maldon left the rails, and went down an embankment, the engine turning over and burying him underneath, both legs being under the engine. It was above two hours before he was dug out. On examination, I found a comminuted fracture of the left leg, and a compound comminuted fracture of the middle third of the right leg, the wound transverse, one inch in length on the anterior aspect. In consequence of having to convey him three miles, the fractures were not reduced for upwards of four hours. He was treated as above. Hemorrhage happened during the first twelve hours; but afterwards he progressed favourably, although he suffered a great deal of pain for two months, which was relieved by anodynes.

June 25th. Moved him on to a water-bed.

July 2nd. Placed the right leg on a fracture-box.

27th. Removed the dressing, and found the wound completely healed, the cicatrix the size of three quarters of an inch. The surface of the skin excoriated from carbolic acid, which had been put on pure on a piece of lint before the fracture was

reduced. The union between the broken fragments not perfectly consolidated. The splints were re-applied for six weeks.

Sept. 16th. The leg united, solid, straight, and in every way doing well.

Case 6.—Feb. 12th, 1869: I removed an adipose tumour, weighing two pounds, situated over the right scapula, from William B., aged 56, a miller. Having sponged the whole of the raw surface with the pure acid, and brought together the edges of the skin with seven sutures, the incision being eight inches in length, I placed over it lint soaked in carbolic oil. During the process of healing (fourteen days) not more than a drachm of pus was discharged.

Case 7.—May 1st, 1869: Robert H., aged 2 years, whilst playing with lucifer matches, ignited his bedgown, and was severely burnt over the chest, abdomen, and thighs. The case was treated for the first week with medicated wool and linseed oil; afterwards with a lotion consisting of half a drachm of carbolic acid to twelve ounces of water. The sufferings of the child were intense until the lotion was applied, when the pain was mitigated in a few hours. Healthy action set up, and the little patient rapidly progressed favourably.

With such satisfactory results as these, there can be no doubt of the efficacy of the carbolic-acid treatment; whereas fractures treated in the ordinary way are frequently attended with local inflammation and suppuration, profuse discharge of pus from abscesses, long-continued exfoliation of bone, hectic fever, and sometimes loss of limb or life.—*Lancet, Nov.* 20, 1869, *p.* 704.

41.—ON WHISKY AS AN ANTISEPTIC DRESSING IN SURGERY.

By Dr. DAVID BLAIR, Ballachulish.

[Alcohol has lately been used in some of the Paris hospitals as an antiseptic dressing for wounds, and, as it has been the practice in Islay to use whisky for the same purpose, Dr. Blair has had considerable experience in the matter.]

The district (Islay) in which for eight years I practised medicine, is one where whisky distillation is carried on extensively, and where, consequently, as may be inferred, this article can be got undiluted and unadulterated. In any serious cases of accident in which it may be recommended by the medical man, the distillers very liberally give it in the pure state, to be applied under his direction. From this source the poorer classes, who could not otherwise obtain it on account of its high price, are often supplied, and thus the medical attendant is enabled to

adopt this treatment in any case for which he may think it applicable. As a dressing to wounds, I have found it not only efficacious, but what is a great recommendation to its use, especially in country practice, it is easily applied. In the wards of an hospital, with the assistance of well-trained nurses, and all the other "appliances and means to boot," it is comparatively easy to carry out any line of treatment, however difficult or complicated its manner of application; but in general practice, and particularly in extensive country districts, where patients are not unfrequently many miles distant from the medical practitioner, and where necessarily much of the treatment must be entrusted to attendants who are not at all times very intelligent or trustworthy, it is of great importance to employ simple means, and nothing can be simpler or less troublesome as a dressing to wounds, than spirit lotions. I usually apply the whisky as follows:—

To remove foreign substances or clotted blood, the wound is first washed thoroughly with strong whisky, it is then closed with stitches if necessary; again bathed with whisky, and covered by a rag and bandage both saturated with the same fluid; and finally, all is enveloped in gutta percha tissue or oiled silk, and directions given to the attendants to wet the bandage from time to time with the spirits. As a rule, the first dressing is not disturbed for three or four days, and afterwards it is changed every day, or every second day, according to circumstances. The principal thing to be attended to is to have the bandage kept wet with the whisky—but not *too wet*, or it will impede the progress of the cure. I have never seen *much* sloughing, and I have not once seen erysipelas occur in wounds treated in this way. Probably because septic germs, if they exist at all, are not numerous in our hyperborean regions.

Since I left Islay, a year ago, I have not used whisky in all my cases of wounds, still I have used it occasionally, and its value has not diminished in my estimation, although I have tried carbolic acid and other antiseptics. The following cases may be given in illustration:—

Case 1.—J. M'P., a boy, aged 10 years, was amusing himself near a corn thrashing machine, his hand got entangled in the wheels, and before they could be stopped, the middle finger and its metacarpal bone were crushed to pieces, the palm of the hand was lacerated severely, the ring finger was denuded of the flesh on the palmer aspect, but the bone was not broken. The boy, having been put under the influence of chloroform, I removed the lacerated part and injured bone, then dressed the wound with strong whisky. The following day, when visited, the boy was sitting by the fireside, supporting his hand on a pillow laid on his knee. He was quite comfortable and cheer-

ful, and could not be induced to remain in bed. I need not detail the progress of the case, suffice it to say that the hand healed rapidly, and I ceased attendance in three weeks.

Case 2.—Boy, 8 years, had his hand caught between the wheels of a hay-crushing machine, which was driven by a horse. Before the animal could be stopped, the hand of the boy was fixed in, and the arm drawn round the wheel so firmly that the little fellow could not be extracted until the machinery had been turned backwards. The thumb and next two fingers were torn off at their articulation with the metacarpus. The palm of the hand and inner aspect of arm up to axilla were lacerated so badly that we feared it would not be possible to save the whole arm; the metacarpal bone of the thumb was smashed, and had to be wholly removed. We resolved to take away, in the first place, only what was strictly necessary of the hand, and gave the arm a chance of recovery. The parts was wrapped in cloths with whisky, in the usual way, and the friends directed to wet the bandage two or three times daily. On the fourth day we removed the dressing for the first time; there was no discharge, no inflammation, no swelling. The arm looked well; the case went on uninterruptedly, and I only required to see him thrice.

Case 3.—J. S., aged about 60, had his finger crushed by machinery; amputated part of two of them. Applied whisky; no inflammation, no suppuration. Result good.

In other three cases of amputation of the finger I used it with equal success.

I have also used whisky as an application to bed sores. When fever occurs epidemically in country districts and villages, especially in the Highlands, it generally causes a panic among the inhabitants. The dread of contagion is so great that occasionally no one will venture to undertake the duties of nurse; under these circumstances bed sores are of frequent occurrence. I have seen more than one case in which the os sacrum and coccyx were exposed from sloughing in typhus, and yet the patients recovered. The bed sores were treated with linseed and oatmeal poultices, mixed with whisky, until the slough separated, then whisky lotions were applied.

In cases of chronic and scrofulous abscess, I have used whisky as an injection, and find that it checks the discharge and hastens the cure. In a case of scrofulous abscess of the hip joint I attribute the recovery of my patient to its having been used in this way. The pain and hectic before and for some time after the abscess was opened, caused so much prostration that I had slight hopes of my patient's recovery. I persisted, however, in using the injections two or three times daily, bathed the whole limb often with spirits, and kept it wrapped in cotton wadding

and a bandage. The stomach for a time would not tolerate solid food of any kind, and even beef tea provoked nausea. Notwithstanding, in an incredibly short time, my patient rallied, and I had the pleasure of seeing him able to walk well, although the joint continued somewhat stiff.

In a singular case of abscess, situated beneath the muscles in front of the abdomen, which opened at the umbilicus, I was highly pleased with the result gained by these injections. The discharge obstinately continued, although I perseveringly applied for a considerable time poultices and lotions of different kinds; at last, I resolved to inject with strong spirits, but from the peculiar situation of the abscess, and fearing inflammation might supervene, I used it very cautiously at first, but no unfavourable symptom having followed the first application, by degrees it was used more freely—two or three syringefuls at a time repeated twice or thrice daily. In a few days there was a marked improvement, and soon the discharge ceased completely, and the patient is now well.—*Glasgow Medical Journal, Feb.* 1870, *p.* 205.

42.—ON TRANSVERSE FRACTURES OF THE PATELLA.

By JONATHAN HUTCHINSON, Esq., Surgeon to the London Hospital.

[Mr. Hutchinson concludes a long and able paper upon this subject by the following recapitulation of what he has shown in it.]

1st. That a very remarkable state of physiological inactivity in the damaged muscle results from fracture of the patella.

2nd. That the fact of this inactivity destroys the common explanation of the displacement of the upper fragment.

3rd. That this displacement is usually due, not to muscular traction from without, but to fluid pressure from within.

4th. That the real cause of weak union is the bulging of fluid between the fragments.

5th. That atrophic shortening of the quadriceps often follows these injuries, and, whilst it greatly disqualifies the muscle for extension, renders flexion very dangerous to the uniting ligament.

6th. That an exceedingly interesting and curious occasional result is, permanent and complete atrophy of the muscle concerned.

Should the conclusions which I have stated be confirmed by future experience, it is probable that they will also be found applicable to some other forms of fracture and of injury to tendons. Indeed, it is in the possibility that they may illustrate a physiological law of wide bearing that their chief interest consists.—*Medico-Chirurgical Transactions, Vol.* lii, *p.* 339.

43.—FOREIGN BODIES IN THE KNEE-JOINT.

By HENRY M. TYRRELL, Esq., Surgeon to the Mater Misericordiæ Hospital, Dublin.

[The patient was a cook, 26 years of age. On admission her left knee was found slightly flexed, the joint was a little swollen and painful, and on any attempt being made to lean on the limb the pain became intolerable.]

The patient, who is of a strong robust habit, gave the following history.

Eight days before admission, whilst discharging her ordinary duties, she was seized with a sudden pain in the joint, which at the same time became fixed in a slightly flexed position; she was unable to walk and had to be carried to bed. On the following day mustard plaisters were applied, without affording any relief; these were followed by poultices and other soothing applications, but as no good effects were produced she was recommended to come into hospital, which she accordingly did, her symptoms being as already described, viz., pain and swelling in joint with the limb in a slightly flexed position.

Mr. Tyrrell, considering the case to be one of sub-acute synovitis, placed the joint on a pillow and ordered evaporating lotions to be assiduously applied; in three days the swelling subsided, but the pain and rigidity remained. Tincture of iodine was now applied to the knee daily for a week, but without affording relief. She also had an anodyne at bed time. The joint was then blistered with vesicating collodion and the pain ceased, unless when an attempt was made to move the knee. The limb gradually assumed the extended position, but painful startings supervening, a gutta percha splint was applied to the ham, which, by securing rest, gave perfect ease. At the end of a fortnight the splint was removed and the joint strapped with soap plaister, and after a few days the patient was enabled to get about. One day, when the strapping was removed, the patient herself discovered a small tumour on the outer side of the joint in the situation of the external lateral ligament. The tumour was movable, as it slipped away when pressed with the finger. She called Mr. Tyrrell's attention to it, and after a few days' observation it was found that when the tumour could be felt the patient could walk without pain, but when it slipped away the joint became fixed and painful. In a short time a second tumour was discovered, the patient being able to secure both at the outer side of the joint. At this time the patient was unable to lie on her right side, for as she herself described, "when she attempted to do so the lumps fell down to the inner side, and then got into the joint."

There being no doubt as to the diagnosis, efforts were made with various appliances to secure the loose bodies at the outer side of the joint, but after a few trials were given up as useless.

Mr. Tyrrell now determined to remove one of the cartilages, and gave directions to have the patient put to bed and to have a wooden splint applied behind her knee.

On the 7th of July (one week after the patient was confined to her bed) he removed a cartilaginous body much resembling a garden bean in size and shape; it had a short pedicle. The wound in the skin was secured by two ligatures and dressed with carbolic oil. No constitutional symptoms followed. The wound was stripped on the third day after the operation, when it was found to have perfectly united. The sutures were removed.

On the 2nd of October he removed the second cartilage, it was like the first, but smaller, and had no pedicle. The wound was treated like the former one, but the operation was followed by some slight pain and tension, and when the dressing was removed on the fourth day pus escaped—a small abscess had formed. However, the patient got well rapidly and was up eight days after the operation.

A slight weakness of the joint remained for some weeks, but in time it wore away, and she was discharged perfectly cured early in December.

I have forgotten to mention that after each operation cold lotions were assiduously applied over the knee until all danger of inflammation had passed.

We all know that there are two methods of removing these bodies. The one by cutting down to them at once: the other by subcutaneously dividing the synovial membrane and pushing the body into the subcutaneous cellular texture, and, afterwards, when time has been given for the wound in the synovial membrane to heal, either to allow the cartilage to remain in its new position or remove it by an incision of proper size in the skin, according to circumstances. This affection is comparatively rare, and it is very seldom indeed that two have been removed from the same joint.

I myself never saw a cartilage removed from the knee-joint until I did so myself.

On reading up the subject before I operated I was led to believe that the operation is a very easy one, that the body can be easily steadied, and that it starts out when a free incision is made over it, and also that it can be easily pushed into any part of the joint you may select.

My case proves the contrary. In the first place, it is most difficult to steady the cartilages; indeed, it was only the patient herself who could do so satisfactorily, and when operated on

she did not take chloroform, but most resolutely and efficiently steadied the cartilages between her two thumbs. It did not start out when cut down upon, and was at a much greater depth from the surface than I imagined. Neither could you select the site for operation, as the upper and external side of the joint was the only place where they could be felt.

As I determined to give the carbolic acid a fair chance, I performed the operation of removing the cartilage by direct incision at once, and dressed the wound as stated, with carbolic oil. The first operation did beautifully; I thought it was owing to the antiseptic plan of treatment, but that could not be so, as in the second operation a superficial abscess formed. Surely, if carbolic acid was the cause of the absence of inflammation in the synovial membrane, it should have prevented suppuration in the part with which it was in nearest relation.

The following deductions may be drawn from the experience gained by this case:—

1st. That foreign bodies may exist for a length of time without giving rise to any symptoms.

2nd. That they are occasionally, even when made most prominent, at a considerable distance from the surface.

3rd. That we cannot always select the situation for removal.

4th. That in cases where the body is at a distance from the surface the subcutaneous removal of it would be attended with much difficulty.

5th. That the success of the case was not due to the dressing of the wounds after Lister's method.—*Medical Press and Circular, April* 13, 1870, *p.* 286.

ORGANS OF CIRCULATION.

44.—ON THE BENEFICIAL RESULTS OF UNDESIGNED AND ACCIDENTAL HEMORRHAGE IN CERTAIN CASES.

By SAMUEL HEY, Esq., Senior Surgeon to the Leeds General Infirmary.

Every physician is well acquainted with what are frequently called critical hemorrhages, in which a patient, reduced to the lowest point, from that moment steadily recovers; *e.g.*, in typhus, hemorrhoids, and hemoptysis. The surgeon often meets with cases in many points analogous to those above alluded to, but they have not been prominently noticed by surgical writers.

1. Excessive hemorrhage in severe injuries is often followed by speedy recovery, the higher and destructive results of inflam-

mation are prevented, and sufficient power remains only for the adhesive process and union by first intention. Thus a bad case of cut-throat, whose life was despaired of for many hours, recovered completely in eleven days. Again, in cases requiring primary amputation, where the loss of blood has been so great that the operation must be deferred for several hours, the patient not unfrequently progresses favourably to recovery without a bad symptom. This has to me often, through a long course of years, being so striking that I have sometimes ventured to predict a happy termination. In these cases, the patient seems to be reduced to the more favourable condition of one suffering from chronic disease. For example, about three months ago, I had to operate on two persons during one week for injury of the upper arm. The first, from gun-shot, had no loss of blood. The second, from severe laceration and compound fracture, was, by hemorrhage, reduced to the last extremity. The first died speedily from traumatic gangrene; the last recovered without drawback. They were about the same age.

Numerous cases of this kind have led me to be little anxious about considerable bleeding during an operation where the antecedent effusion of blood has been slight; having, however, due regard to the constitutional condition of the patient, and his probable powers of restoration.

2. The second class of examples are those in which bleeding is beneficial, though undesigned and unwished for, and, indeed, occurring where it might seem to be the most undesirable.

A gentleman, aged 55, had in the epigastric region a tumour, ten inches in diameter, followed by ascites to the fullest possible extent. The tumour was connected with the liver, was marked with veins on the surface, and was supposed to be malignant. The skin of the abdomen and the lower extremities were excessively œdematous. Paracentesis was performed three times at intervals of six weeks. After the last operation, the patient appeared to be dying for several hours; by the use of stimulants he rallied. On the third day, a catheter was introduced through the wound; serum, very deeply covered with blood, was drawn off, and it was then discovered that a deep-seated vein had been wounded, and its contents poured into the abdomen. From this time, recovery commenced, the dropsy disappeared, and he became again a strong and hale man, and is still living at the age of seventy-five.

3. The most common order of instances where undesigned hemorrhage is not only useful but curative, is to be noticed in large, and deep, and intractable phagedænic ulcerations. I have seen this so often that I am almost at a loss to select examples.

A man suffered from a large and deep burn on the chest, and, after many weeks, appeared to be hopelessly sinking. A considerable venous hemorrhage took place from the flabby granulations, and straightway they became healthy, and cicatrisation and recovery took place rapidly.

Many instances have come under my notice where deep syphilitic ulcers in the groin, vulva, and nates, and on the legs, have at once cleared up on the occurrence of considerable hemorrhage, especially where the patients had previously undergone a course of antisyphilitic treatment.

Two patients are at present under treatment at our hospital, one an in-, the other an out-patient, where the nose, lips, palate, and bones, have been to a great degree destroyed. In both instances, a spontaneous vigorous hemorrhage has cut short the disease, and in one has led to all but perfect cure of the ulcerations, leaving only the unsightly results of destructive disease.

It was only after I proposed to write a few lines on this subject, that I learnt that my friend Mr. Jessop, formerly our house-surgeon, had, in our journal last December, noticed briefly cases where even the femoral artery had been opened by phagedænic ulceration, and the hemorrhage thence arising had arrested the disease. Mr. Jessop now informs me that he has, in one case of syphilitic ulceration, tested by *practice* the value of this teaching of the "effort of nature," by opening the arteria dorsalis penis with every good result.

I only throw out these few remarks to lead to further observation. To enter into physiological discussion would require rather a book than a short unpretending practical paper.—*British Medical Journal, Jan.* 29, 1870, *p.* 101.

45.—ON THE TORSION OF ARTERIES.

By Thomas Bryant, Esq., Surgeon to Guy's Hospital.

[Mr. Bryant having removed a number of the larger vessels from various subjects, and twisted the ends freely, had them filled with a vermilion-coloured wax injection. Careful sections were subsequently made of the preparations. The result has been a number of admirable models, displaying most if not all of the modes in which hemorrhage from a twisted vessel is arrested. The physiological facts shown, and the conclusions drawn from a consideration of these modes are as follows:]

The facts show that by the torsion of an artery the inner coats are divided, and in the majority of cases turned inwards, and that in the most perfect examples these incurved coats

form complete valves, not unlike the semilunar valves of the heart, on the injection of the vessel, either by the blood of the patient during life, or by artificial injection after death.

They show that in other cases—how many it is difficult to estimate—the valvular incurvation of the divided inner coats is not so perfect as to prevent the passage of a small portion of blood or injection with the first rush of fluid, although it is tolerably clear that the valve is subsequently rapidly closed with any increase or continuance of the injecting force.

They prove, likewise, that in some cases this valvular incurvation of the inner coats is exchanged for a general splitting of the tissues, hemorrhage being prevented by the clotting of the blood between the irregular laminæ of the divided membrane and the twist of the external cellular coat.

They also prove the great value of the knot formed by the torsion of the external cellular coat; for although in such instances as are shown in figures 1 and 2 the support of such a twist appears to be of secondary importance—the valvular incurvation of the inner coats being apparently sufficient of itself—no one can doubt its value in such cases as figures 3 and 4 are meant to illustrate. And even if, in a large number of such cases, the valve formed by the divided recurved inner coat proves to be perfect after the first rush of the blood current has taken place, the knot formed by the twisted external coat must prove a valuable support, and in doubtful cases, where an imperfect valve exists, it must be of still greater importance. In figure 5 the presence of the twisted external coat is surely of value, not only by forming an obstacle to the immediate escape of blood through the broken-up inner membrane, but by giving time to allow of complete coagulation of the blood which has been caught between the laminæ of the inner coats.

We come, therefore to this conclusion—that although there is no physiological necessity, in the most complete examples of torsion of an artery, for the preservation of the knot formed by the twisted external coat, there is in the imperfect examples; and as it is impossible for the surgeon to know during life, in any given case, whether the valvular incurvation of the inner coat has taken place in the most complete way or not, and as it is at least probable that an imperfect incurvation of the inner coat exists, it seems to be more prudent for the surgeon to act on the side of caution, and to preserve this twisted external coat in its integrity in all cases.

I look upon the valvular incurvation of the inner coat as the chief means adopted by nature for the arrest of hemorrhage, and the twist in the external coat as an all-important additional security; the elastic and yet brittle inner tunic, with its

tendency to adhesive inflammation, requiring, in all but the most perfect examples, during the first few hours after torsion, the support of the tougher external one.

The more the inner coat is broken up by the twisting of the vessel, the greater is the need of the external coat to give it support.

The more the end of a large artery is twisted, the more is the inner coat broken up and the greater is the danger of disturbing its valvular incurvation.

When the end of a healthy vessel is twisted off, the inner coat is, as a rule, greatly broken; when the end of a diseased vessel is so treated, it is split into fragments.

When a limited number of rotations of the forceps—two, three, or four—are applied to a healthy vessel, the valvular incurvation of the inner tunic is, as a rule, complete; and the more diseased the artery, the fewer are the rotations required.

The propriety of twisting off the end of an artery or leaving it on becomes, therefore, a matter of great importance, and a great practical question which has yet to be decided.

From the remarks I have already made it will be evident that my own opinions tend to support the practice of leaving the twisted extremity of the vessel *in sitû*. Dr. Humphry has, however, come to the opposite conclusion. How it is, therefore, that we differ upon this point may claim some brief notice, for his authority is so high that his opinions are readily accepted and his practice followed.

First of all, Dr. Humphry clearly shows in his paper that he does not attach so much importance to the reflection of the inner coat, as a barrier to the flow of blood, as he does to the twisting of the outer coat, forasmuch as by this, he states, "the inner coat is not only forced into, but is held in, its new position; accordingly, if a syringe be attached to an artery thus twisted, and water be injected, considerable resistance to the escape of the water is presented; but if the twisted portion of the outer coat be cut through, or dissected off, the water very soon escapes. It has little difficulty in finding its way through the inner coat, or of separating the surfaces, when the support afforded by the outer coat is withdrawn."

These facts are undoubtedly correct, my own experiments have confirmed them; but the test applied to the inner coat by dissecting off the outer is a very severe one, to say the least of it, and applies to conditions that do not naturally exist. The facts tend, moreover, to prove the value of the twisted external coat rather than the weakness of the inner tunic, and suggest to the surgeon the wisdom of doing nothing to weaken the

strength of the twisted external coat. Yet it is to be remarked that Dr. Humphry in most of his experiments twisted off the ends of the vessels, and in doing this, I have little doubt, in a large number of cases he not only destroyed the valvular incurvation of the inner coat, and so broke up the tissues as to render the support afforded by the external coat an absolute necessity, but by the same act of twisting off he likewise weakened the external coat upon which safety under such circumstances absolutely depended; for repeated experiments have proved to me that when a mixture of glycerine and water of the sp. gr. of blood is thrown into a large artery, the end of which has been twisted off, it is far more frequent to find some leaking of the vessel through the divided extremity than when the end of the vessel has been only twisted three, four, or five revolutions.

When the arteries are diseased this fact comes out still more clearly, for in a diseased artery the inner coat is so brittle as to break and incurve on one or two rotations of the forceps. One or two more rotations break up the inner membrane into pieces very like those seen in Fig. 5, and by twisting the end off the artery it is very apt to be destroyed.

The twisting off of the end of a large artery crushes up the inner membrane, and too often lacerates the external, destroying by one act the valvular incurvation of the inner tunic, upon which the arrest of hemorrhage so much depends, and weakening the support which the external coat would otherwise give, and which under such circumstances is so much required.

In a recent amputation of the thigh, where the vessels were much diseased, the truth of these remarks was well illustrated, for when I twisted the femoral artery three complete revolutions the end become so loose that I thought it was off, and leakage followed, but when I took the vessel up again, having cut off the lacerated extremity and twisted its end two rotations, good success ensued. This case illustrates the practical truth that in applying torsion to a diseased vessel a more limited number of rotations of the forceps should be made than to a sound artery.

What we want to effect by the torsion of an artery is a laceration and incurvation of the inner tunic, and to support this incurved membrane by the twist of the external coat. We do not want to crush up the inner tunic too much, or to weaken in any way or to lacerate the external. By twisting off the end of the vessel I have abundant evidence that we incur a greater risk of falling into both of these errors than by making a limited number of rotations of the forceps and leaving the end of the vessel on. All my experiments and observations tend to prove

this in a direct way, and the facts that Dr. Humphry has supplied by his experiments go to support the same views.

If it be generally true, therefore, as a modern writer in the last edition of 'Holmes's Surgery' has so dogmatically asserted, "that torsion is unsuitable for diseased arteries, and large vessels, even though healthy, cannot be invariably secured by it, Professor Humphry having found in his experiments on animals that the outer coat is sometimes too much weakened by the rotation," he should have added *when rotated off*, for it was made true only from the fact that torsion was carried to too great an extent. For all my experiments and nearly two years' experience have convinced me of the following conclusions:

That torsion may be safely applied to all arteries of the extremities and to all those of the trunk which are in size less than or equal to the femoral. To the carotid and iliac vessels it has yet to be applied.

That it is almost as applicable to diseased as to healthy vessels, the former requiring fewer rotations of the forceps than the latter.

That in large healthy vessels, such as the femoral, the extremity should be twisted till resistance has been overcome, but no further—three, four, or five rotations of the forceps being, as a rule, all that is needed. These rotations should be made sharply.

That in large atheromatous vessels the same rule should be applied, two or three rotations of the forceps generally sufficing.

That in all small vessels torsion may be applied very freely, even to the separation of the end, although when evidence of disease exists it is better to proceed with more caution and not to twist off.

That in every case where a large artery is twisted it is advisable to allow a current of blood to flow into the vessel before the forceps are removed from its end. This caution not only tests the completeness of the act in all cases, but in doubtful ones facilitates the coagulatton of the blood in the meshes of the broken-up inner membrane.

For nearly two years I have practised torsion upon arteries and veins of all sizes up to the femoral, and I have seen it practised likewise in all ways. During that period I have never, with one or two exceptions, applied a ligature to a divided artery in an uncomplicated case. No instance of secondary hemorrhage from a large or small vessel has yet been recorded after its use. I have certainly had more cases of primary union of wounds during this period. Stumps have healed more kindly and wounds have closed more rapidly. I have not seen anything

to make me hesitate about the value of the practice, but I have seen much to encourage me in its adoption.

It may require some care in its application, but not more than the taking up of a large vessel, and the application of a ligature to its end with neatness. Any surgeon or dresser who can do the one can do the other, and I am not sure that to the inexpert one mode of arresting hemorrhage is more difficult than another. In the practice of torsion to such a large artery as the femoral even rough handling has proved successful (as it has before in the application of a ligature); and when torsion succeeds at the time, every hour that passes strengthens the probabilities of success, whereas, in the case of the ligature, such cannot be said to be invariably the fact.

Torsion may, in exceptional cases, be troublesome to perform; in others it may prolong an operation; and in some cases it may even fail to arrest hemorrhage. But, upon the whole, the adoption of torsion must be looked upon with favour, for it certainly is applicable in the majority of cases, it tends to simplify surgery, to hasten the repair of wounds, to discourage suppuration, and to add to the general safety of our patients. To apply torsion it is only necessary to seize the artery firmly, and to twist it sharply till resistance ceases. Any forceps that hold firmly and do not tear will do; although for large vessels a broad end is required.

At Guy's Hospital, up to the present time, the femoral artery has been twisted at least twenty-two times, the tibial seven, and the brachial three. I have applied torsion in upwards of a hundred cases altogether; no difficulty of any importance has been experienced in any case, and nothing but a good result has yet been recorded. I may add, likewise, that amongst our house-surgeons it is proverbial that since torsion has been employed secondary hemorrhage after operations has been comparatively of rare occurrence.—*Guy's Hospital Reports*, *Vol.* xv, 1870, *p.* 285.

46.—THE ANTILIGATURE FORCEPS.

[The following case presents features of much interest.]

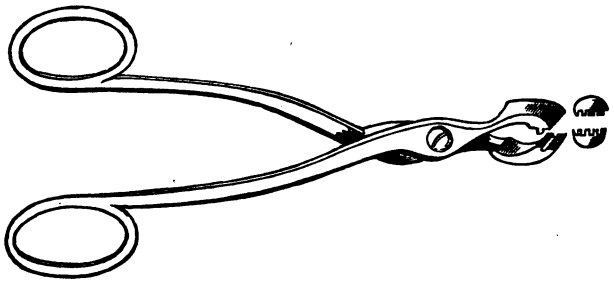
Dec. 9, Sarah B., a married woman, aged 46, was admitted into St. Bartholomew's, under the care of Mr. Coote, with a scirrhus of the right mamma. She was operated upon by that gentleman the following day.

As soon as the excision was accomplished, Mr. Webber, who happened to be standing near the operator, suggested the use of the forceps he, it seems, invented many years ago. Mr. Coote,

who had, it appears, seen Mr. Webber use this instrument with entire success upon arteries of very considerable size in the removal of an unusually large breast, at Brompton, ten or eleven years since, at once acceded to the proposition. The effect upon the divided vessels was instantaneous and perfect.

No blood was lost, no secondary hemorrhage ensued, and the patient made a good recovery. Mr. Coote mentioned this very satisfactory case in his surgical lecture a few days afterwards.

[We have seen the forceps, and its striking effect upon dead vessels, through which, when fresh, after being pinched by the forceps, it is not easy to impel air—so complete is the dovetailing and closure of the divided end of the artery. We append a wood engraving of the forceps, which is intended to produce the

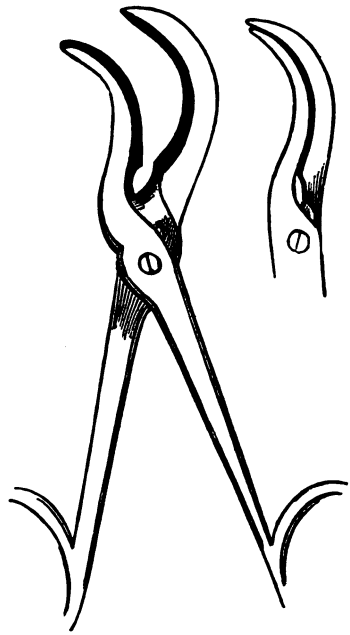


same effect as the gnawing by the teeth of animals in the division of the umbilical cord. They may be obtained from Messrs. Maw.—Ed. *M. T. & G.*]—*Medical Times and Gazette, Jan.* 15, 1870, *p.* 76.

47.—INTRACISOR FORCEPS FOR ARTERIES, TO SUPERSEDE THE LIGATURE.

We are able to place before our readers the engraving of the Intracisor, invented by Mr. Webber, and made by Messrs. Maw, for the purpose of securing all the advantage of the ordinary ligature without entailing any of its strangulating consequences or its inconvenience—as a foreign body left in a wound which it is desirable to heal quickly. Among its recommendations are, it seems, the small wound necessary in exposing the vessel to be operated upon; the facility with which the lower concave blade can be passed under, and made to isolate the vessel from the

contiguous tissues; and the complete circumferential division of its inner friable lining, accomplished without interfering with its outer coat when bringing the two blades into close apposi-



tion. We have witnessed the effect of the intracisor on a dead artery: nothing can be more perfect.—*Medical Times and Gazette, Feb.* 12, 1870, *p.* 189.

48.—ON GALVANO-PUNCTURE OF NÆVUS.

By Dr. JOHN DUNCAN, M.A., Assistant-Surgeon to the Royal Infirmary of Edinburgh.

I have already published in the *Edinburgh Medical Journal* (1866 and 1867) two papers on the use of electrolysis in aneurism, and I related among others a severe case of the cirsoid variety cured by that means. The resemblance in structure

between cirsoid aneurism and nævus encouraged me to hope that electrolysis would be as successful in the latter as it had been in the former. It is impossible as yet to ascertain the exact value of this form of galvanism in the treatment of blood-tumours; but the cases I here shortly note may prove of use in determining how far it is applicable to nævi.

Case 1.—The nævus occupied the greater part of the upper eyelid of a child 8 months old, and was rapidly increasing in size. After several operations it was almost entirely hardened, but in consequence of the impatience of the parents the case was completed by subcutaneous ligature.

In *Case* 2, the nævus occupied the upper eyelid of a child 6 months old, and was about the size of a walnut. The skin was implicated only in so far as it had one or two visible veins coursing over the tumour. After five operations the whole was hardened, and greatly diminished in size. As the parents were obliged to return to the country, I lost sight of the child for some time; but I lately heard from them that it died of bronchitis some months after the last operation, and that then the swelling had entirely disappeared.

Case 3 was a nævus of the forehead, implicating the skin that covered it, and was sent me by Sir James Simpson. The child, a year old, was brought from the country by its parents, who took it back immediately after one operation had been performed. The electric action was continued till the skin assumed the whitish hue that indicates cauterization. The child was to be brought back for a second operation if the cure was not complete; but it has not since been heard of. I have no doubt that it was cured.

Case 4 was a nævus of the upper eyelid, very similar to Case 1, but with the skin completely involved. Two operations hardened the subcutaneous portion, which was thereafter largely absorbed. After two months, as it was again increasing, an operation was directed to the cure of the skin, which had not as yet been affected by the electrolysis. Its vitality was destroyed, and a black slough separated almost without suppuration. A cicatrix remained, but did not interfere with the motions of the eyelid.

Case 5.—A nævus of the abdomen, of small size, cutaneous and subcutaneous, in a boy 5 years old. A slough separated after one operation, which effected the cure.

Case 6 was a nævus on the forehead of a child 11 months old, sent me by Dr. Aitken. It was very flat, from the skin being more involved than the deeper textures. It was cured in three operations, two of which produced small sloughs. I embraced

the nævus in a ligature, to arrest the blood-current, while one of the operations was being performed; but this proceeding did not apparently affect the result.

I have since successfully treated one or two other nævi in the same way, but as they do not materially differ from those already mentioned, they need not be further detailed. Some were simply hardened, and thereafter became absorbed; others had more or less sloughing, according to the amount of nævous skin.

There can, I think, be no doubt that any nævus is curable by electrolysis. From the result of these cases, however, I fear that its practical usefulness is limited, and that many nævi can be more quickly and conveniently cured by other means. There is, from their very nature, this marked distinction between cirsoid aneurism and nævus in amenability to treatment—that, while in the former the blocking-up of main affluents leads to the extinction of the rest of the tumour; in the latter, occlusion of a veinule seems to have little influence on its neighbours. Nævi have this obstinate characteristic, whatever mode of treatment be adopted. If a portion be left out when the ligature is applied, its growth is accelerated rather than otherwise. When the subcutaneous part of the tumour is cut out, according to Mr. Jordan's recommendation, it would seem that the affected skin over it remains unchanged. Perchloride of iron must by its immediate presence produce a clot in each individual vessel before the cure is complete. In like manner, the electrolytic action must pervade the whole nævus, and act directly on almost every little vein. Now, electrolysis cauterizes the tissues as much as it coagulates the blood; and it is evident, accordingly, that when the skin is much affected a slough will be produced. Several of the cases are examples of this. The slough is tough and dry, excites little irritation, is singularly slow to separate, and does so without a drop of hemorrhage, even though part of the nævus remains. Galvanism is safe therefore and effectual; but if a cicatrix must be left, there is reason for preferring the ligature as more simple and speedy. The galvanic apparatus is cumbrous, and in most cases the operation requires frequent repetition. Still, if the skin be not greatly occupied by the enlarged vessels, sloughing may be avoided by a very cautious approach to the surface, and by using small needles and a weak current. In subcutaneous nævi, moreover, especially when they occur about the head and neck, galvano-puncture possesses many advantages. The injection of such astringents as perchloride of iron is both less safe and less certain; and excision necessarily leaves a scar, which electrolysis never does, if properly insulated needles be employed. Again, there is a class of nævi which lie beyond the reach of knife and ligature. Some months ago Mr. Spence asked my opinion in a

case of nævus, which so occupied the hand of a child (a year old) that the fingers protruded from the mass like small roots from a turnip. He told me that his experience of injection in a similar case was such that he should prefer amputation. My opinion was that a cure could be brought about by galvanism, and probably without loss of skin. The result has amply justified the opinion. After two or three operations in the Infirmary, the patient was taken home to Peebles, where Dr. Connel so carefully and skillfully continued the treatment, that when the child returned, a few days ago, hardly a trace of the nævus remained. A few hard nodules occupied the palm, but the motions of the hand are perfect. The only accident had been a slight suppuration after one of the operations. There is also at present in the Infirmary, under Mr. Spence's care, a girl about nine years old, whose left cheek is wholly occupied by a large nævus, which extends over the parotid region and part of the neck. I have already aided in the performance of two operations which have hardened a large portion of the cheek, and I have no doubt that the treatment will be successful. It is a case of greater difficulty than the other, because, especially in the neck, the skin is traversed in many places by a network of vessels, large and small. The subcutaneous part of the nævus bears, however, a very large proportion to the tegumentary; and I think it likely that there will be no sloughing or consequent scar.

These two cases illustrate well the class of nævi for which galvanism is best suited. Indeed, its only drawback is that it demands considerable patience on the part both of surgeon and patient. In every other respect it is superior to injection, ligature, and excision. Mr. Teale, it is true, has recently advocated and put in practice excision of nævus of the parotid. But in the case I have described, the extent of the nævus plainly forbade such an attempt; and even had it been smaller, a treatment so easy and safe as galvano-puncture must be preferred to excision.

I have nothing to add to my former descriptions of the apparatus used. Other batteries may be more convenient than Bunsen's, but, having become familiar with its manipulation, I have not thought it worth while to change. The needles I formerly recommended have invariably been found to answer the purpose completely.

Before concluding, let me say one word on an objection to electrolysis, which has been made a good deal of by various recent writers—I mean the introduction of gas into the circulation. Professor Rutherford, in his able article on Electrotherapeutics, recommends that the positive pole be alone introduced, as its gaseous products are more easily absorbed, and it causes the firmer coagulation of blood. I might be

inclined to follow his advice in a case where one needle only is required, if such a case may be met with. But had he observed the effect of a negative pole, as I did notably in the cirsoid aneurism, and had he remembered that that needle is much the more powerful cauterizing agent, I believe he would have modified his recommendation. It is useful not only in coagulating the blood, but also in shrivelling-up and destroying the coats of the vessels through which it passes. In such cases, therefore, I strongly advocate the introduction of both poles, for I hold that the presence of gas in the circulation is of very slight importance. Mr. Lawson Tait, indeed, says that he "assisted to kill" a patient with innominate aneurism by this means, but he gives no details, and he is the only man who has done so. I can well believe that in innominate aneurism, if the carotid have not been compressed, clots and froth and everything may have been whirled from the needles to the brain as quickly as they were formed, and that fatal embolism might result. But those who have read the researches, especially of French surgeons, into the causes of death by the introduction of air, will see at once that this source of danger is not present in galvano-puncture. It has it dangers, which I believe render it not very suitable for aneurisms like the innominate, and these I have pointed out in a former paper; but for cirsoid aneurism, for some not amenable to compression, and probably for such as the gluteal and sciatic, it is an admirable mode of treatment, and I would hope that the cases I have related may in some measure determine its use in a certain class of nævi. It is hardly necessary to add, that the spontaneous disappearance of nævi is so frequent as to render the number suitable for any operation comparatively small.—*Edinburgh Medical Journal, March* 1870, *p.* 777.

49.—CASE OF POPLITEAL ANEURISM TREATED BY COMPRESSION.

By Dr. PATRICK HERON WATSON, Surgeon to Royal Infirmary and Chalmers Hospital, Edinburgh.

[The patient was a man 30 years of age. He had a large aneurismal tumour, occupying the lower third of the inner side of the thigh.]

The tumour when examined presented all the characters of an aneurism. It extended from the lower border of the sartorious muscle as far as the middle of the popliteal space, and at its centre increased the circumference of the thigh by three inches. The whole limb below the tumour was venously engorged and swollen.

The swelling had only existed for six months, but the limb had been the site of painful rheumatic sensations for more than three years, the swelling first manifesting itself at the point where the pain had been most intense.

Friday, 24th Sept. The pulsation, thrill, and bruit, together with the pain, are all exaggerated; I accordingly shaved the surface, and commenced the compression by means of my own apparatus, applying the weight, for reasons I shall afterwards give, over the superficial femoral artery, just above the sartorius.

25th. The compression has been diligently superintended by my house-surgeon, Mr. Bentley, and continued till to-day at visit, *i.e.*, for twenty-four hours. Throughout all this period there had been neither pulsation, thrill, nor bruit discernible, and now the sac is firm and resistent. There is no pulsation in the superficial femoral, but a powerful pulse in the common femoral and profunda. The gum-plaster, which had been applied over the groin, is loosened, by the copious transpiration from the cutaneous surface, and came away whenever the weight was removed. The patient said, during the first six hours the pressure of the weight occasioned him great uneasiness, but that since then there had been no pain of any kind, except a sensation of burning in the tumour and inner side of the calf beneath this point.

The limb was wrapped in cotton and laid comfortably on pillows.

26th. There is slight pulsation recognisable in the most prominent part of the tumour, but there is no pulsation to be recognised in the superficial femoral.

27th. The aneurismal symptoms occupy the whole extent of the tumour.

28th. The superficial femoral is again pervious, and the aneurismal symptoms exactly as they were before the employment of the compression.

The groin was again shaved, and the whole of Scarpa's triangle and lower part of the belly on the right side having been thickly dusted with fullers'-earth, the weight was now adjusted so as to compress the *common* femoral artery, and, if required, the external iliac. Here it was retained under the surveillance of my house-surgeon and dressers for forty-eight hours without intermission, and without the slightest recognisable pulsation, thrill, or bruit. The patient had experienced no pain at the site of compression, but the same burning sensation in the sac and down the limb was experienced after the lapse of about six hours.

There has been no return of any aneurismal symptoms since the period when the compression was reapplied; the patient has,

however, been retained in hospital to admit of the further progress of absorption of the coagulum taking place under constant supervision, as from the size of the sac the risk of suppuration was deemed a possible contingency. During the whole period while the compression was maintained, iodide of potassium, in drachm doses, was given three times a day, without inducing coryza or other signs of iodic intoxication.

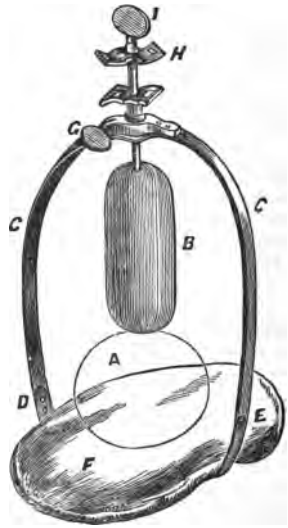
This is now the third case in which I have employed compression successfully in the treatment of aneurism. The two former cases I have already detailed to the Society, and in the remarks I then made I said that, so far from compression being an inferior means to ligature in the treatment of aneurism, it might possibly prove more efficient than ligature, by affording the means of interrupting the arterial supply through the main trunk at a higher or lower point according to the exigencies of the case, instead of being confined to one point, as was necessarily the case in the use of the ligature. The present case appeared to me to afford an opportunity of putting this to the test of practice. When I first saw this case, I pointed out to the pupils attending the visit that, as the anastomotica magna was given off just about the middle of the sac, the effect of any means employed to check the free circulation through the sac, which acted only upon the superficial femoral artery, but did not restrain the circulation through the profunda femoris, was not likely to afford such an interruption to the circulation as would suffice to effect a permanent obliteration of the sac cavity. I therefore, in the first instance, confined the compression to the superficial femoral artery, and was agreeably suprised to find that consolidation did occur. It did not, however, become permanent; for within forty-eight hours the aneurismal symptoms became established, not in the first instance by the superficial femoral becoming again pervious, but by the collateral circulation through the anastomotica magna bringing the blood round to the middle of the sac with sufficient force to break up the recent clot. It is quite possible that, at this stage, had I supported the superficial femoral by compression, so as to prevent the coagulum in it becoming disturbed, these aneurismal symptoms might have abated, just as we see in cases where the ligature is applied, the circulation in the sac is first stilled, then reproduced, and then gradually becomes completely and permanently arrested; the great difference between the two conditions of ligature and compression consisting in the permanent obstruction of the afferent artery at the point of deligation in the former, which does not necessarily occur at the point of compression in the latter. There is, however, a sufficient number of cases upon record to prove, after the treatment by ligature, that the circulation

through the sac may become re-established, and the aneurism show no tendency to undergo any definitive consolidation.

If such a result occurs after ligature of the superficial femoral, flexion of the limb, ligature of the external iliac, or compression of the common femoral have been the measures proposed, should bandaging of the limb, the application of cold, or graduated compression of the sac prove insufficient. But flexion of the limb, in such a case as the present, could exercise but little influence upon the sac, as the disease was too high up to be directly influenced by the pressure, and bulged too much to admit of such flexion as could be assumed materially to impede the flow of blood through the popliteal below the sac.

The patient could hardly regard a second operation practised upon his limb for aneurismal disease with much satisfaction after, and because of the failure of the first; while to employ compression as a curative agency after the failure of the ligature would scarcely redound to the credit of the ligature, or be likely to lead the surgeon, who fell back upon it in a time of need, to speak of the ligature or make use of it so confidently upon a future occasion. Having made my experiment, and observed as its result that mere compression of the superficial femoral, however absolute, is not sufficient to effect a permanent cure of the disease where the aneurism corresponds to the origin of the anastomotica magna; furthermore, the aneurismal symptoms being now again reproduced in their original condition and intensity, I resorted to compression of the common femoral above the origin of the profunda, and found not only that the pressure was better borne because almost painless, but effected a thorough and complete consolidation of the sac some time within forty-eight hours after it was applied. The compression was so unflinchingly borne, and its application was so efficient in arresting all appreciable flow through the sac, that no aneurismal sign was observed, nor was there anything except the consolidated feeling of the sac, and the sensation of burning pain in the sac and leg, which could have indicated that all was silenced in the aneurism, till the withdrawal of the apparatus proved that it was really so. If we assume that the burning pain in the sac and limb beyond is pathognomonic of completed consolidation, then the compression was maintained for forty-two hours longer than was necessary, and these six hours formed the whole obligatory period during which it must needs have been maintained. The immunity from pain during this longer period indicates how easily, so far as the patient is concerned, pressure in this situation or a little higher up may be persistently maintained without the patience of either patient or attendants becoming exhausted. From what I have previously observed, I should expect the attendants to be more likely

to give in than the patient; for while he may sleep, and generally does sleep, the watcher for the time being must be on the alert to prevent any movement of the limb or trunk from displacing the accuracy of the adjustment, and thus impairing the efficiency of the pressure upon the afferent trunk; for to compress the vessel leading to an aneurism efficiently the pressure must be sufficient to prevent the smallest wave of blood from passing beneath its control; it must, in other words, be *absolute*. If it is not, it is merely annoying the patient and losing time in obtaining a cure. How much time may thus be employed without effect is well shown in a case narrated by Mr. Digby Longfield, of the Royal Navy, in a recent number of the *Lancet*, where, after a month unavailingly expended in flexion, the use of Carter's compressor, Signormi's tourniquet, and digital compression, a brief application of the weight by means of a very inefficient machine sufficed to attain a satisfactory result.



Dr. Watson's Aneurism Compressor.—A, Imaginary outline of limb. B, 12 lb. weight. C C, Metal arc, hinged at E, and opening by a pivot nut at D. G, Pinch screw of universal joint (ball and socket). I H, Upper part of rod, gliding through ball and socket, supporting and guiding the pressure weight. F, Splint to which the arc is attached, and on which the limb is laid. This apparatus was constructed out of a Carter's apparatus, by elevating the arc, removing the elastic, and elongating the rod as a support for the channelled weight.

I have not been able to discover any means of applying the weight more satisfactorily than the apparatus I formerly exhibited to the Society, and which I have employed in all those cases.

It admits of easy and accurate adjustment. It can be easily made by any mechanician, however rude. It utilizes all the weight necessary to arrest the flow of blood, but acts simply by dead pressure, there being neither screw pressure nor elastic bands in its composition. It admits of the pressure being regulated by the inclination of the axis of the weight. The form of the weight admits of its being easily borne without galling or unnecessary diffusion. Lastly, its metallic resisting surface secures the parts against all softening by soakage, or loss of power after it is once applied by yielding.

It has but one objection, viz., that it is not intelligent, and needs watching; but that is an objection to all compressors hitherto invented, and one which is not likely to be overcome so long as patients are restless and the compression must be maintained absolutely and exactly. With a little intelligence employed in its original application to the part, and in the arrangement of the patient's posture, this watching is reduced to a minimum, and the success of the result is likely to attain its maximum of efficiency.—*Edinburgh Medical Journal, April* 1870, *p.* 909.

50.—THE OBLITERATION OF VARICOSE VEINS.

By Henry Lee, Esq., Surgeon to St. George's Hospital.

There is at present in the hospital a man named R. C., æt. twenty-three, who was admitted eleven months ago, with varicocele of the left side. The left testis had then nearly wasted away, and the dilated veins were painful. He had for two years and a half been under the care of different medical men, and had taken large quantities of medicine without relief.

On the 5th February, two needles were passed between the enlarged veins and the *vas deferens*, and slight pressure was applied to the veins by means of ligatures passed over the ends of the needles. The veins thus compressed by the ligatures were then divided midway between the two needles, by subcutaneous section.

On the day following the operation, the testis of the affected side was very tender; the next day it was swollen; the ligatures over the needles were removed.

Feb. 9th. The needles were removed; the patient was quite easy and free from pain.

Feb. 10th. A considerable amount of thickening had taken place in the scrotum on the left side.

Feb. 14th. The left testis appeared about twice the size that it was when he was admitted.

He now left the hospital and went into the country. Upon his re-admission, eleven months after the operation, the veins which had been then obliterated had not again enlarged, but the left testicle had nearly regained its original and natural size. He had experienced no pain in the part since leaving the hospital, and had remained without inconvenience. Of late, however he had been suffering from some pain in the right testis; the veins on that side were somewhat enlarged, and the testis he believed had become smaller than formerly. Recognizing the symptoms, as he believed, with which the atrophy of the left testis commenced, he came to town of his own accord in order to ascertain whether the disease could be averted by the same means as had formerly been adopted on the left side.

I take the foregoing as the text of a lecture because it is one of a large number of cases of enlarged and varicose veins which have been operated upon in this hospital, and an opportunity is now afforded to all those who are interested in the subject, of observing the results of the operation nearly a year after it was performed.

My principal object, however, in recurring to the subject of varicose veins and their obliteration, is to review concisely the causes which have prevented an apparently very simple operation from having been as safely practised in former times as at present; and what I have now to say will apply equally to varicose veins of the leg or of the scrotum.

Sir Everard Home was at one time in the habit of applying a ligature to the *vena saphena major* in cases where the veins of the leg were varicose. In these operations the skin was divided, and a silver needle with ligature was passed under the vein, and the vessel was tied. It was erroneously supposed at that time, as I have already stated, that the lining membrane of a vein when irritated would secrete lymph, just as a serous membrane might, and that the opposite sides of the vessel would thus be glued together.

Mr. Travers, in his very valuable observations on wounds and ligatures of veins, has expressed the idea generally prevalent in his day in the following words:—"The inner membranes of arteries and veins are susceptible of the adhesive inflammation. In veins the inflammation extends from the point irritated towards the heart. The lymph coats the vein like a fringe." The following account, taken from Mr. Travers' work, affords a description of the effects occasionally observed in his day after the operation of placing a ligature upon a vein:—

"I remember about the year 1801, when the operation of tying the saphena major vein was frequently practised for

varicose ulcers of the legs, an elderly woman being the subject of this operation, which was performed in Guy's Hospital, a little above, and on the inner side of the knee. Inflammation of the vein followed, and several abscesses formed in the direction of the vessel, below the ligature, on the inner side of the calf of the leg. It was accompanied with great constitutional disorder; some of the abscesses ulcerated, others advanced with great difficulty to the surface, and the patient died, worn out by excessive irritation. In a second case, that of a man who had drunk hard, two ligatures were made upon the vein, and the vessel was divided between them. In three days the man complained of pain in the course of the vein from the place of its division to the groin: an inflammatory blush appeared upon the leg, extending from the knee to the ankle, and on the succeeding day considerable swelling. The pain above the ligature extended to the bottom of the belly, and the thigh became swollen and tender upon pressure; the constitution sympathised with the local disease, and without the formation of abscesses as in the former case. This man died, as it appeared, from extended inflammation of the vein."

Mr. Hodgson mentions two cases in which the division of the varicose vein terminated fatally; the first on the morning of the fourth day, the second on the seventh or eighth. The same author relates a case from the practice of Mr. Freer, of Birmingham, in which the ligature of a varicose vein was followed by pain in the chest, hurried and laborious breathing, and vomiting of blood four hours after the operation, which symptoms were immediately relieved by the removal of the ligature. The operation was followed by fever and vomiting, and retention of urine, when performed on another varicose vein of the same patient six weeks afterwards, although the ligature was removed immediately after its application; and again by similar symptoms of constitutional disorder, when repeated upon two other veins after an interval of nine weeks, the ligatures being cut away immediately after their application. The fever went further on the latter occasion; the patient was attacked with delirium and severe vomiting on the second day; the symptoms continued on the third and fourth days; on the sixth she was slightly delirious, and her respiration much oppressed. "In this case," says Mr. Hodgson, "the obliteration of the vein was the consequence of the application of a ligature which was immediately removed."

In the fifth volume of the *Edinburgh Medical and Surgical Journal*, Mr. Oldknow, surgeon, of Nottingham, communicates the following important narrative:—

A young man, about twenty-three years of age, of plethoric habit, had been troubled for the last two or three years with

painful ulcers about the inner ankle of the right leg, which repeatedly healed, and broke out again, so as to prevent, in a great measure, his attendance to business; he therefore became desirous, on my representation, of having the saphena vein tied, it being varicose to within a hand's-breadth of the knee. The operation was performed in the following manner. An incision, three-quarters of an inch long, and about one inch and a-half above the distension, was made through the skin, immediately over the vein, and in the direction of its course. The cellular substance was then carefully divided, the vein lying deeper than usual, until its upper surface was completely exposed. A probe armed with a double ligature was passed under the vein, taking care to include nothing with it, it being clearly dissected from the surrounding cellular membrane upwards and downwards as far as the extent of the first incision, and then tied. The portion of the vein between the two ligatures being afterwards cut out, the lips of the wound were brought together by a suture and adhesive plaister, with a view of healing it by the first intention. The patient was then put to bed, and directed to use a cold embrocation. On the second day he took some opening mixture. Third day, the wound was dressed, and appeared wholly united, except when the ligatures came out. The suture was cut out, and a fresh adhesive plaister applied. On this day he complained of pain in the lower part of the limb, that is, from the lowermost ligature, along the vein down the foot, to use his own expression, as if the blood in the veins were endeavouring to overcome the obstruction caused by the ligature. This sensation was, however, entirely removed by applying a bandage moderately tight, from the toes upwards. On the fifth day there appeared a little erythematous blush about the wound. He had a trifling epistaxis, and I thought proper to take from him sixteen ounces of blood, which was not inflamed; the purging mixture was repeated. Sixth day, complained of a little pain on the inner side of the knee, in the course of the vein; but there was no external inflammation at that part. The lips of the wound began to separate. In the evening he was suddenly seized with a violent rigor, succeeded by a hot fit, and symptoms of great vascular action, and some tendency to delirium. Pulse 130; hard and full, therefore sixteen ounces of blood were taken from the arm; it gave instantaneous relief, and was followed by the sweating stage, which continued several hours, and was succeeded by a state of quietude, soon, however, interrupted by a recurrence of the same train of violent symptoms, at first about once in twenty-four hours, but gradually increasing in frequency, and diminishing in strength, till nature became exhausted; death closing the scene twenty-two days from the operation.

For the first four or five days after the rigor, the wound discharged pretty freely, and by making strong pressure about the knee, a little matter was forced from it. The inflammation crept gradually up the vein, which was evident from its peculiar cord-like feel, and from giving pain on pressure, until it reached the groin, the inferior part getting well as the superior became bad, so that the wound was nearly healed before death, the ligatures having separated about the fourth day. There was no tumefaction of the cellular membrane, no enlargement of the glands in the groin, no superficial inflammation on the thigh. There was, it is true, a slight redness of the skin when the poultice was removed (for the thigh, along the course of the vein, was covered with cold poultice), which entirely vanished on exposure to the air. The medical treatment was strictly antiphlogistic; the patient was repeatedly bled, and with apparent relief every time. Two days, however, previous to his death the vital principle was so exhausted as to need the use of cordials.

Mr. Abernethy believed that it was the ligature that produced the inflammation of the veins in the cases in which such serious mischief followed, and he recommended that the vein should be divided instead of being tied.

Sir Benjamin Brodie adopted Mr. Abernethy's suggestion, and instead of tying the *vena saphena*, cut it across, and applied a compress and bandage. The patient had venous inflammation, attended with very severe typhoid symptoms, and died within four days after the operation. Now, in all the cases to which I have alluded the interior of the divided veins was closed by fibrin only, deposited from the blood. Such a bond of union is constantly liable to give away, and the contents of the veins are then carried into the general circulation. Coagula in veins are in this way, as I have already explained, very readily removed, and if formed from healthy blood, they often appear to produce very little inconvenience to the system. But if these coagula have already begun to undergo morbid changes, if they have already become mixed with other secretions in their neighbourhood, then the most severe symptoms of blood poisoning may be produced. When a vein is simply divided, a certain amount of hemorrhage necessarily follows, and the blood thus effused may undergo morbid alterations, as it lies at the open mouth of the vessel, and these same diseased actions may be readily communicated to the blood still within the vein, and be thus propagated to every part of the body.

The operation of tying a vein affords no security against such accidents; for in accordance with an observation made by Sir Benjamin Brodie, as the ductus choledochus, or the intestinal canal, will heal after the application of a ligature, without *the*

continuity of the canal being destroyed, so it appears to be with divided veins under certain circumstances. Whenever the circulation through a vein is thus restored, the coagula of fibrin which temporarily obstructed its canal are, sooner or later, carried into the general circulation.

It appears to us strange, in the present day, that so many centuries had elapsed before a simple mode of securing a bleeding artery was discovered; and it appears almost equally strange that, although surgeons of the highest intellect in the present generation have, in successive years, given their attention to the best mode of operating upon varicose veins, no method should have been adopted by them for effectually closing the vessels during and after the operation. As in former times the actual cautery was used for the purpose of arresting hemorrhage, so are there still in modern surgery those who prefer the actual cautery or some form of caustic, to the simple mode of closing a vein which I have described in a previous lecture. There has very recently been in this hospital a young woman who had had, I believe, upwards of a dozen sloughs made on her by the actual cautery, and in a recent number of the *Lancet* the same mode of treatment is advocated by a distinguished surgeon attached to one of our metropolitan hospitals.

Sir Benjamin Brodie some years ago applied the caustic potash over clusters of smaller veins, in order to produce their obliteration, and Mr. Mayo subsequently adopted the same treatment for varicose veins of a larger size. Sir Benjamin Brodie has left us the result of his experience in the following words:—"The application was very painful; the slough took a long time to separate; the sore took a long time to heal, and altogether it was a very tedious process."—*Medical Press and Circular*, *Dec.* 15, 1869, *p.* 471.

ALIMENTARY CANAL.

51.—THE USE OF OPIUM IN STRANGULATED HERNIA.

(Case under the care of Mr. MAUNDER, at the London Hospital.)

In a recent case of strangulated hernia, where the effect of a single subcutaneous injection of half a grain of morphia had been very marked, Mr. Maunder took the opportunity of pointing out the danger that might result from the use of opium in such cases. "This drug should never be administered," he said, "to a patient the subject of strangulation, unless the surgeon has determined to resort to operative interference for the relief of the latter within the space of from three to four hours subsequently, provided that the taxis, aided by chloroform, &c.,

fails to effect reduction. In the case alluded to the patient had vomited up to the moment of the administration of the drug; abdominal pain and tenderness in the neck of the tumour ceased after its use, the stomach retained half a basin of beef-tea, and the patient felt 'quite relieved.' But strangulation persisted, as was known by the unaltered condition of the tumour, and by the absence of expansive impulse on coughing. In this way the soothing effect of the drug might ultimately lead to the death of the patient, unless the medical attendant fully understood that during this apparent improvement serious pathological changes were occurring in the contents of the hernial sac." With regard to the seat of stricture in femoral hernia, while operating on another case, Mr. Maunder remarked that, although in very many cases Gimbernat's ligament was its source, yet sometimes, as in this instance, some tight fibres on a deeper plane were the cause. He accordingly advised care in the use of the knife, lest this structure be unnecessarily cut, and the crural ring be thereby enlarged. To avoid this error, if the director be passed between the ligament and the neck of the sac, and can then be moved somewhat from side to side, the ligament is not the seat of stricture, and must not be cut; but it must be looked for either in some deeper fibrous bands or in the sac itself. In reference to chloroform as an aid to taxis, Mr. Maunder had observed that reduction was often effected just when the breathing became stertorous, in cases where similar means without chloroform had failed.—*Lancet, Feb.* 26, 1870, *p.* 301.

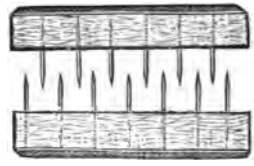
52.—A NEW METHOD OF APPLYING INTESTINAL SUTURES.

[The inventor of the following proceeding is Dr. Béranger-Féraud, of Paris, chief physician to the French navy.]

The necessary materials consist of eight or ten ordinary pins nine millimetres in length, two corks, and a piece of sealing-wax. The way in which this simple apparatus is prepared is as follows. Each cork is cut out in the form of a quadrangular prism, about six millimetres on each side, and of the length of the intestinal wound. Four or five pins are driven into each of these prisms, which they traverse so that the points issue at the opposite surface, whilst the heads are brought down close to the cork. The heads are then embedded in a coating of sealing-wax, and the whole presents the appearance of two little combs. (See Fig. 1.) These combs are then employed in the following manner. The body of the cork prism being in contact with the mucous surface, the points of the pins are made to traverse the intestinal wall from within outwards, at a distance of one or two millimetres from the lip of the wound.

When they have all traversed the tissues, the two prisms are turned so that the points of the pins correspond; and then, on exerting upon them, through the intestinal wall, a slight pressure between the thumb and the index finger, the pins of the

FIG. 1.



right prism are made to penetrate the left prism, and *vice versâ*. The intestinal wound is thus exactly united, so that no foreign body can appear at the peritoneal surface, and the intestine may then be left at rest in the abdomen.

Fig. 2 represents a schematic section, which shows that the two prisms when united form a small oblong body without any outer roughness, and of a size to allow the free circulation of intestinal matter. A few days after the operation, when the circulation of the intestinal wound is complete, the portion of the tissue traversed by the pins detaches itself, the cork falls into the intestine, and is carried out with the fæcal matter. The cork being dry at the moment when it is introduced into the intestine, it results that the humidity to which it is subjected afterwards causes it to swell around the pins, and thus increases the solidity of union. But if any fear is entertained lest the

FIG. 2.

movements of the intestine should bring about the separation of the two pieces of cork, it is easy to introduce into each prism a curved pin of which the head has been previously cut off; and when once the intestinal wound has been closed, by pressing slightly between the thumb and index-finger through the intestinal wound, a union would be obtained which nothing could

destroy in the bowel. But this last precaution is believed to be altogether superfluous.

If the intestinal wound is very extensive, two or more of the prisms which have been described may be placed end to end. The present proceeding is especially indicated for oblique and longitudinal wounds, but may also be applied to transverse wounds. In this case the prisms should be shorter, so that it would take six of them to occupy the entire circumference of the tube. They should first be placed in position separately upon each intestinal segment, and their union effected afterwards.—*Lancet, Feb.* 12, 1870, *p.* 234.

53.—NEW CLAMP FOR HÆMORRHOIDS.

Mr. Sydney Jones, feeling how unequally the clamps in present use press on all parts of the pile to be removed, has devised an instrument in which the bars act in a perfectly parallel direction. This parallel action of the blades is effected by placing the joint-screw at right angles to the blades. A scooping action is at the same time secured, so that the deepest part of the pile is seized and drawn forwards. On the upper surface the blades are sloped, so as to make their line of closure project beyond the general level. By this arrangement the removal of the pile by scissors can be more readily effected. The rack and screw for fixing the handles play very easily: the rack is curved, and, instead of being fixed, has vertical and horizontal movements. Of course, in the use of this clamp the ordinary curved scissors would not have availed; their shape has been modified to adapt them to the curve of the clamp. The principle has been admirably carried out by Messrs. Schmidt and Robinson, of 267, Strand.—*Medical Times and Gazette, Dec.* 4, 1869, *p.* 671.

ORGANS OF URINE AND GENERATION.

54.—ON LITHOTRITY.

By Dr. RICHARD G. BUTCHER, University Lecturer on Operative Surgery, &c., Dublin.

[Dr. Butcher relates seven interesting cases on this subject, and then says:]

In the managament of the foregoing cases, I have laid great stress upon the gentleness with which the lithotrite was intro-

duced into the bladder in every instance. The practitioner must never lose sight of the fact, that it is a widely different thing to pass a straight instrument into the bladder, and making the urethra straight for the instrument, a proceeding which never can be accomplished, owing to the manner in which the membraneous portion is tied up to the pubis by ligaments before and behind, and strong reflections of fascia which render it and the prostatic portion of the canal permanently concave to the bladder. The lithotrite, warmed and oiled, should be passed down to the opening in the triangular ligament, and then the handle of the instrument depressed well between the thighs with a gentle onward movement, when it glides without opposition into the bladder, thus representing in its introduction a lever of the first order. The instrument once in the bladder must be handled with the greatest lightness, and carried to the superior fundus and back part of the bladder, when most likely it will touch the stone; then in withdrawing the male blade the calculus very often falls into the lithotrite. If it should not do so I would say, on the surgeon touching the stone he can easily determine on which side of the instrument the calculus rests; then he should turn the instrument gently to the opposite side, open the blades, and so opened throw it over the stone to the other side, and thus on closing the instrument he will find, most likely, the calculus has been caught; if not, or if any doubt as to the relationship of the stone and instrument exists, the operator should again open the blades of the instrument and cast it to the opposite side over the stone, and then probably he will be more fortunate in securing the foreign body. However, generally speaking, the slightest lateral movement of its blades will determine on which side the stone lies. In this quiet way *the instrument may be applied to the stone in the happiest manner.* Again, as reported in many of the foregoing cases, the lithotrite on entering the bladder, was for a moment held quietly, and the instrument steadily, while the male blade of the instrument was insidiously introduced so as to transverse the lower part of the bladder, the centre of the bladder, and the space beneath. After the stone fell into the jaws of the instrument it was secured and rapidly crushed. There is a movement which I have practised in one or more of the foregoing cases with the lithotrite, and which I have also alluded to in using the forceps in lithotomy as a means of securing a grip of the stone, adverted to by Sir B. Brodie. I shall quote his own words. If on the introduction of the lithotrite within to the lower and back part of the bladder, and on the separation of its blades, the stone does not fall into the lithotrite, "the forceps, without being moved from its situation, may be gently struck with the hand on one side, or on its anterior part, and the slight concus-

sion thus communicated to the bladder, will probably be sufficient to dislodge the calculus and bring it within the grasp of the instrument. If it should be otherwise, the forceps being closed may be very gently and cautiously turned to one side or the other, so that the curved extremity of it may make an angle of 25° or even 30° with the vertical line of the body, then opened and passed in the direction of the rectum, in the manner already described."—(*Med.-Chir. Transactions*, vol. xxxviii, p. 174.) The chief advantages of this proceeding is to place the instrument in a position presumed to be advantageous, *and to bring the stone to the instrument.*

On the perusal of the foregoing cases it will be perceived that I do not approve, after crushing the stone, of working away in extracting the fragments; if the urethra is free, and in that condition which would warrant lithotrity, the fragments must be left for expulsion by the contractile force of the bladder itself; it may be said the bladder in its deranged state, so contracted, so irritated, cannot expel the detritus; if the bladder is in this state I would say cut the patient; if the bladder is in this condition that it has no power in expelling its contents, and so the broken up fragments, surely the most sceptical must admit, it is in no state to admit with impunity, without seriously resenting the irritability and violence created by the oft-repeated introduction of lithotrite, or catheter for the suction bottle, to mechanically extract those portions of stone recently broken up. When the bladder is inflamed, even secreting pus, absolutely on the verge of ulceration in some patches, how can it be credited that this practice can prove salutary? No doubt, in some instances, cases seen early before all the serious consequences of stone in its advanced stage are set up, the calculus may be broken up into fine fragments, and extracted piecemeal, with good instruments and a steady hand, without much pain and with little or no harm to the patient; and yet his urethral membrane may be torn, as I have seen by this quick method, and extravasation of urine occur, and I doubt not that this method may lay the foundation for permanent stricture of the urethra. I must emphatically say I do not sanction this method in even any of the cases that will bear it; but, the large mass of cases of stone in the bladder in the adult and old, will not permit such obtrusive meddling. The irritability is so great, the changed tissues of the parts by disease are rendered so sensitive, that the surgeon will be fortunate if even, after preparatory sedative and soothing means, he can get an exploring instrument, sound, or lithotrite into the bladder; and when fortunate in doing so and making himself accurately acquainted with the nature of the case, he is glad to pause, and consider

the most suitable way of removing the foreign body. If the urethra is sound, though all this terrible anxiety about the bladder, he may and possibly will decide on crushing the stone, gently using the instrument for a few applications to it; first, in its primitive size, and two or three times after to its larger fragments, and then leaving them to be cast out by the efforts of the bladder in expelling the urine; and it is very remarkable, at least so I have constantly observed, when, after the stone has been well and carefully broken up, how soon the terrible excitability subsides, the sharp edges of the broken pieces are soon smoothed down, and on the second or third day large quantities of detritus are expelled, though for the two former days scarcely a fragment had come away. The irritability being subdued and the muscular tone of the bladder developed, a larger quantity of water is retained, and a greater expulsive power is restored, and so the frrgments now begin to pass with the larger and more certain continued stream.

However fortunate the surgeon may be in crushing the stone in properly selected cases, yet there are others, as I have before adverted to, where the knife offers a far better chance of success. When, for instance, the case is of a long standing, with the vesical symptoms greatly aggravated, the bladder contracted, with its mucous membrane highly inflamed and even secreting pus, when the prostate is enlarged and the "*bas fond*" of the bladder deep, always holding in it a quantity of fetid ammoniacal urine and pus, when the urethra is hard and rugged, and spoiled in its natural structure from repeated attacks of inflammation and venereal excesses. In these cases a direct passage into the bladder by the lateral method of lithotomy is the correct mode of proceeding. In a few seconds the stone is taken out, the source of irritation removed, the fetid contents of the bladder has a ready outlet. I have no fear of dividing the enlarged prostate; if moderately done, it will in most cases then yield to force, sufficiently for the purpose of extracting the stone without passing beyond the fascial covering of the gland. I admit, in some instances, the prostate is very firm and rigid, and will not tear, then the surgeon should pass the index finger of his left hand into the opening, and on it convey down the blunt pointed knife and divide the rigid parts. Sooner than cut extensively I prefer breaking the stone than extracting it in pieces through the wound, and then washing out the bladder. If the opening through the prostate be carefully executed by limited section and forcible dilatation or rather tearing, there need not be much apprehension of serious bleeding from the prostatic plexus of veins or vessels.—*Dublin Quarterly Journal, Feb.* 1870, *p.* 44.

55.—ON LITHOTOMY IN THE INFANT.

By Dr. RICHARD G. BUTCHER, University Lecturer on Operative Surgery, &c., Dublin.

[A child was admitted into Sir Patrick Dun's Hospital under Mr. Butcher's care, suffering from stone in the bladder. The symptoms had existed for nearly a year.]

The operation was performed after the following manner, October 20, 1869, at 10 o'clock a.m. Early in the morning, a little warm water was thrown into the rectum, so as to empty the bowel, and the urine was retained in the bladder for two hours previous to the above time. The child was placed upon the operating table, and brought under the influence of chloroform. I then passed the staff and struck the stone. Compression was made upon the penis to prevent the water flowing off. Each hand and ankle were then bound together, and the patient brought down to the end of the operating table, upon which the buttocks steadily rested, immediately sustained by a blanket, covered with a sheet neatly turned in, on a line with the edge of the table, and secured by a couple of laps of bandage to prevent slipping. In the act of tying up the child, the rectum discharged its contents, and slightly prolapsed; the part was cleaned, and the gut restored. I may here add, it is a custom of mine immediately before applying the knife, both in the old and young, to introduce my finger into the rectum, and thus solicit the evacuation of any fluids or solids which may be there, and so secure the safety of the bowel. The staff was taken by an assistant standing on the left side of the patient, and held well up to the pubis; an assistant on either side separated the limbs, and held them wide apart, the sole of each foot resting firmly on the table, so as to insure the proper axis of the pelvis. Bringing myself to a convenient height by going down upon the right knee, feeling diligently with the index finger of the left hand, the staff could be discovered traversing the membranous portion of the urethra, I then laid the knife on, about three-quarters of an inch in front of the rectum, probably a line or two less, and immediately to the left of the raphe, carrying it with a determined weight backwards and outwards for fully an inch and a half, midway between the anus and ischium, but nearer to the former, thus dividing skin, superficial fascia, and much fat. Again the knife was carried to the front of the wound, and struck at once into the groove of the staff, at the anterior part of the membranous portion of the urethra, the instrument was moved gently from side to side, to make certain it was fairly lodged, then slightly lateralized, and passed backwards and upwards, dividing the membranous portion of the urethra. The point of the knife was then, as it were, brought

away from the groove of the staff, its blade holding the same amount of lateralization, and made to cut its way from this deep position backwards and outwards, accurately in the line and axis of the first incision to its posterior extremity. The sharp-pointed knife was then laid aside, and the narrow blunt-pointed instrument substituted, to complete the careful and accurate section of the prostatic portion of the urethra. The staff being rigidly maintained in the same position, there was no difficulty in inserting the blunt-pointed knife in its groove; a double movement and concentration of action was now brought into requisition. The blunt-pointed knife was held up well to the groove in the staff, while the index finger of my left hand lay in the acute angle between its back and the groove in the staff, and thus the knife was pushed backwards and upwards, dividing the rudimentary prostate and neck of the bladder, the finger and knife went into the bladder together—some of the water gushed out, but some was retained by my finger blocking the opening—the staff was withdrawn, and the knife laid aside. I next introduced the gorget, its concave surface resting partly on the side and back of my finger nearly to the tip, then with half a turn it glided into the bladder, when my finger was withdrawn, and the forceps, with its closed blades, and in its narrowed axis, passed along it, the hand of the operator being in the prone position; the gorget was then laid aside, and I raised myself from the kneeling position; the instrument was rotated by half a turn, the hand being made supine. The stone, though felt, could not be readily seized, owing to the size of the instrument; a smaller one was passed in after a similar manner to the first, and on opening its blades and striking it gently the stone fell into the chops of the forceps, and was readily extracted by an up and down movement of the instrument as it rested upon the index finger of my left hand acting as a fulcrum beneath. By these combined and gentle movements the stone was extracted with the least possible force, and with comparatively little violence to the wounded parts. The stone was composed of lithic acid, and about the size of a small walnut. Finally, the finger was passed into the bladder and swept all round it, to make certain that no second stone was there. The patient was next unbound, and the *canule à chemise*, well oiled, introduced into the bladder, and retained by suitable tapes. He was then laid on his back in bed, a folded blanket under him, his knees tied together, with a small soft pad between, and the thighs slightly flexed, by a pillow placed beneath the hams; thus the wound was protected from pressure, and a ready escape afforded for the water from the bladder. Quickly the child awakened from the chloroform, and was quite unconscious of what had been done.

[The wound was healed, and the patient perfectly restored to health by the 18th of November.]

I have laid particular stress upon the various steps of the operation, as I advocate its performance, yet there are some points which I wish to repeat and dwell upon. The sounding of the patient in the first instance requires a few words. It should be ascertained whether the child had passed water recently; if not, all is well; but if so, the child should be placed recumbent, brought under the influence of chloroform, and then two to four ounces (according to age) of tepid water injected. The little sound should be then warmed, oiled, and gently, lightly passed into the bladder. To facilitate this result, the instrument should not fill the urethra, but glide easily along it; but other advantages flow from the instrument not being retained tightly in its route; its point can be elevated, depressed, moved to either side—in short, made to explore the bladder with freedom, and with a certainty that never can be obtained if the urethral grip be close, biting, and constricted. The instrument most effective in detecting the stone is one somewhat short in the sweep, and with rather a short curve; so constructed, it can readily be moved in all directions with accuracy and precision. When the presumptive symptoms of stone are present, and strongly marked, the surgeon should be tenacious of his opinion, and not lightly put aside the case because he has failed on one or two occasions in finding the stone. No; the child should be placed in bed, all irritation subdued by tepid baths and suitable medicine; and after a few days the examination may again be made, both in the recumbent and upright position, the bladder being, of course, in a state of repletion. If the stone be not detected while the patient is lying down, then a hollow silver instrument should be passed, and the position changed to that of standing up; the urine should then be permitted to flow slowly off, and very probably the calculus will strike the instrument, and give satisfactory evidence of its presence. I have laid stress upon passing the staff before the patient is tied up, and for these reasons:—In the first place, it is easier to do so, and safer, when the limbs are relaxed; and secondly, any unexpected difficulty may unsteady the hand of the unpractised operator. The educated touch of the trained surgeon may reject this advice, but I would caution the young surgeon not to do so, for too much force may be communicated to the staff, and if so, it may very readily be passed through the upper wall of the urethra in front of the bladder, or, again, very readily behind that viscus, between it and the rectum. The tissues comprising the urethra at this tender age are so feeble in their cohesion that they will readily yield to violence; and, again, the angle to the bladder, at this period of life, is so

acute that greater facility is afforded to the instrument in going astray. It is well that a couple of ounces of water should be retained in the bladder previous to the staff being introduced; it facilitates the detection of the stone; and the stone should invariably be struck previous to cutting the patient—not only because the stone, if a very small one, might have escaped from the bladder, but because this evidence not only proclaims the presence of the stone, but also *that the guide to it is direct and certain, the instrument has not gone astray.* Now as to the form of the staff: It is essential that, beyond its curve, it should be of considerable length, otherwise, when fairly held up to the pubes, there will not be a sufficiency of it in the bladder, owing to the long neck and pelvic position of the organ. As to the arrangement of the groove in the staff, it should begin well in front of the commencement of the curve, on its convex surface, so as to be at its full depth, where the surgeon strikes for it at the beginning of the membranous portion of the urethra. I prefer the groove on the convex surface of the instrument to that on the side, subjected to this modification, *that one side be a little lower than the other, so that when the instrument is introduced, the side next to the right hand of the operator be a little less than a line lower than the opposite edge of the groove, which condition should maintain to within three-quarters of an inch of the end of the instrument, when it should gradually come up to a level with the opposite side;* such an elevation guards against any slipping of the knife when within the bladder. This arrangement facilitates the lateralization of the knife to the required extent, without changing the staff from its proper position, held up to the arch of the pubes, and it is in direct opposition to that reprehensible practice of trying to rest the staff upon the stone, and partially turning the groove to the incised side, so as to leave the operator to it; this latter manœuvre greatly endangers the rectum; it also facilitates the slipping of the knife, and its wandering away from the director; and it may readily entail more extensive division of the neck of the bladder posteriorly than requisite, or at all safe. One word more with regard to the way in which the staff should be held—it is a word of caution to the assistant, that in his anxiety to see the wound, and the steps of the operation, he should not bend over the patient, and so depress his hand, thus changing altogether the position of the staff, and bringing the extremity of its curve out of the bladder. If so, unfortunately, the knife falls short of it, and the operator may fail in reaching the viscus, and even not be able to rectify the error into which he has been led, so I would warn the surgeon, before he completes his last incision, to look well to the position of the staff.

Now, as to the first incision, there is no use in beginning it

too far forwards, for no additional space can be obtained by doing so for the extraction of the stone. The close proximity of the osseous walls on either side prohibit such a sequence; but the incision should go well back, and nearer to the rectum than the ischium, and considerably beyond the former. By so doing commensurate space is secured for the travel of the stone, and a direct outlet is provided for the dribbling of urine from the bladder.

Next comes the important step of opening the urethra. The knife should enter and strike the staff at the commencement of the membranous portion of the urethra; the index finger of the left hand will discover the instrument and the part, and the scalpel should penetrate a couple of lines behind the first incision. The knife being lodged in the staff it should be moved quietly from side to side so as to make certain of its presence there; the instrument should then be slightly lateralized, as admitted by the construction of the staff, and so pressed steadily backwards, dividing the membranous portion of the urethra, even to the rudimentary prostate and neck of the bladder; the hand should then be depressed, of course, bringing down the knife with it, and so the instrument withdrawn, thus dividing the intervening parts from the termination of the membranous portion of the urethra to the posterior extremity of the first incision, creating a great triangular gap; the apex at the prostate, the base at the perineum, direct throughout.

I cannot lay too much stress on the necessity of freely opening the entire of the membranous portion of the urethra by the one and continuous stroke of the knife. This should be the surgeon's aim, for if the knife be introduced again and again with the intention of clearing the staff, the difficulties of completing the operation are greatly increased; the urethra is wounded and notched in several parts; shreds of it may hang into the groove of the staff, and impediments so offered to the blunt-pointed knife, so that it cannot travel freely or with security to the division of the prostate and neck of the bladder. But graver consequences may still follow this imperfect division of the membranous portion of the urethra. It may be so injured by the repeated wounds that the remaining connecting tissues may fail to resist the efforts essential to the completion of the operation, and give way, and so the surgeon may thus be foiled in reaching the bladder. The membranous portion being fairly divided throughout, the blunt-pointed bistuory is to be introduced into the groove of the staff, and immediately the index finger of the left hand into the angle between it and the staff. The right hand presses the blunt point firmly to the staff, and at the same time onwards towards the bladder. While the index finger of the left hand is in contact with and

pressing it in the same direction, both arrive at the rudimentary prostate, the onward movement being still continued, the back of the knife resting in the pulp of the finger, the sharp projecting edge slightly lateralized makes sufficient division, and both enter the neck of the bladder. The wrist of the right hand now is slightly lowered, and pressure downwards and to the left side gently made, with the point of the finger resting on the bistuory to the extent deemed necessary. The blunt knife and the finger being within the neck of the bladder, the blunt instrument may be laid aside; and now, and not until now, can the staff be taken out with safety. Upon the finger is then introduced the blunt gorget in the manner already described, and upon it the forceps. It is much safer, in the young or old, to conduct the forceps by the gorget to its destination than upon the finger; first, because it will travel through a smaller space; secondly, and most important, the liability of the instrument's slipping aside and unnecessarily separating parts, even to the passing between the bladder and rectum, is done away with and guarded against. The forceps passed along the finger seems more showy to lookers-on; but greater security is insured to the patient by conducting the instrument through the hollow of the gorget; therefore the latter must be received and considered most practical.

I have depicted [vide *Dublin Quarterly Journal* for illustrations] the sharp knife which I use for the external incision, and likewise the blunt-pointed instrument for the division of the prostate and neck of the bladder. Both are represented in their form and shape for children. The sharp knife is very slightly, in the least possible degree, cut off at its point so as to make it glide along the staff more evenly. A word with regard to the formation of the blunt instrument. It should be long and narrow in its blade, quite straight, not curved like Cooper's hernia knife. I have had it constructed for myself, *with the point blunted for the eighth of an inch*, not more, not as Cooper's hernia knife, for half an inch at least. I lay great stress upon this point, because I have found, when the knife was blunted too far from the point, in gliding along the staff, *the hinder portion of the blunt part being out of the groove, hitched against parts that required to be divided, and so created difficulty in keeping the instrument in its proper track, and sometimes even tilted it from its position;* therefore I always use the instrument with little more than a button point, about the eighth of an inch long; and the cutting edge need not be so extensive as figured in Cooper's bistuory. The form of the knife I prefer and use is accurately represented. The gorget, made of steel, should be slightly hollowed, not wider than the index finger, or even so wide, somewhat longer, and slightly tapering

towards its extremity, its edges nicely rounded off, and its handle of the same metal, set at an obtuse angle with the shaft.

The forceps being within the bladder, the gorget or forceps' director may now be taken away, and search made for the stone. Every effort should be made to seize or secure it in the most favourable axis, and the index finger of the left hand should be brought into requisition to assist this project, as illustrated in the case which I have described. When the calculus is caught, too much pressure should not be exerted upon it lest it may be broken up into fragments, a result not to be desired in ordinary cases. To prohibit such a consequence a little slide may rest upon one of the handles, and when the stone is caught it may be passed down, and so prevent any closer approximation of the blades; I have forceps so constructed by Savigny. In the delivery of the stone the index finger of the left hand should be always used as a fulcrum upon which to lever the forceps, and so materially facilitate its extraction, and that, too, with the least possible amount of contusion and injury. Such can be accomplished, even though the stone be large. The advantages of this mode of practice is adverted to in several of the cases which I have recorded in my work on "Operative Surgery," and clearly in the case which I have just recited recently operated upon.

As to the form of the forceps, it should be long and narrow in its blades, each blade very gently curved and rounded off at its margins, roughened on the inside to secure their grip, and they should be firmly riveted together, so as to prevent, by pressure through the leverage of the long handles, the approximation of the long blades, a casualty which would endanger the coats of the bladder. Curved forceps may also be at hand, but they will seldom be required at this period of life. The *canule a chemise* I have had represented of its full size, for the young subject, and so it should be prepared for use. The slight circumferential groove in the outer plate of the canula, commencing half an inch above the aperture in its extremity, permits the fine linen to be fastened there in its position, with very little increase of bulk or volume. The tapes connected to the opposite end effectually retain the instrument in the bladder, when attached to a band, which should be made firm around the patient's loins; the tapes ought likewise to be carried beneath and around each thigh, and then tied. Care must be taken that the instrument is not thrust in too far; *its extremity should only rest within the neck of the bladder*, and then no uneasiness can be occasioned by its presence, and all its salutary influence may be obtained. The foregoing case marks plainly its time for removal."—*Dublin Quarterly Journal, Feb.* 1870, *p.* 1.

56.—ON LITHOTOMY, AND ON CERTAIN CASES OF ENLARGED PROSTATE.

By Sir WILLIAM FERGUSSON, Bart., F.R.S., Serjeant-Surgeon to the Queen.

[There are several statements made and questions raised by writers on lithotomy which are either untrue or unnecessary. This arises from those who have least experience in the operation, writing the most upon it. For instance, the infiltration of urine alleged to be so common has no real existence, it is so rare that Sir W. has never yet seen an instance of it. Again, the question as to the exact size of the prostate in adult life with a view to limitation of the incisions, sinks into insignificance when we remember the comparative rarity of an operation for stone at this period of life.]

Although most formidable cases of stone are often met with in old age without any marked enlargement or change in the prostate, it frequently happens that the lithotomist finds the gland enlarged, and in the ordinary lateral operation his knife, finger, and instruments, pass through the part where enlargement is almost invariably greatest—viz., the lateral lobe. In the normal state of the prostate, the firm fibrous structure, as usually seen by the anatomist, can be readily appreciated. Even when there is enlargement, the firm fibrous character may still seem predominant. But in many instances, as the forefinger passes towards the bladder, the sensation is as if its point glided through several rounded bodies in the substance of the gland, which are but slenderly in contact with each other. It is seldom that the pathologist takes this route in examining or displaying the gland, and so perhaps little has been said about this condition. For my own part, although, like others, familiar with the condition, I had never heard any reference to it in association with lithotomy, and it was not until I had some considerable experience in this operation that I perceived the great importance of the fortuitous combination. Repeatedly I had been conscious, during a succession of operations, of feeling, and often, too, of seeing, this condition. The feeling may be easily understood, but seeing can only be appreciated after explanation. When the stone is being extracted, within the grasp of the forceps, there is often considerable resistance, even when the knife and forefinger have been freely used to give ready passage to and from the bladder. In some instances the stone, whilst all but through the wound, seems to be held *in situ*. If at this time the operator looks carefully, particularly on pushing the skin and margin of the wound a little aside, he will see some tissue or substance between the blades in the

space between the hinge and stone. With a slight pressure of the point of the finger this object will disappear from between the blades, and extraction will then seem comparatively easy. This is in reality one or more of the lobules referred to. It has not been grasped between the blades in seizing the stone, but has slipped into the space, as the forceps and stone have been drawn outwards. On such occasions I was glad to let the substance remain without further notice, and I confess to the fear that by referring specially to what I had noticed I might be deemed to have used unwarrantable liberties with the prostate. After repeated experience of this sort, it occurred to me that the propriety of leaving such loosened masses was questionable; and at last, on a tempting occasion, I seized, after the extraction, one or more of these bodies, and partly tore and partly cut them away. To my great delight, no evil followed, and the patient, about seventy-five years old, made a most satisfactory recovery, having no special symptoms afterwards.

In 1848, I exhibited specimens of this kind at the Pathological Society of London, and not long after heard whispers about rough and improper proceedings in lithotomy—coming chiefly, or rather solely, from those who had rarely, if ever, performed the operation. Criticism of the kind was almost enough to deter from similar pathological information, but I have since followed the practice repeatedly whenever it seemed to me needful, and I have never had occasion to regret doing so. The subject has recently been brought under my notice in a peculiarly interesting manner. During lithotomy on a patient nearly eighty years of age, in whose case my anxiety was special, I recognised this condition of the prostate. There was no peculiarity in the operation, but in extraction I recognised the hitch above refered to. When the stone was extracted I turned my attention to the lower part of the prostate, and found it so loose already that I accomplished its enucleation with the point of the forefinger of my left hand, with as much readiness almost as if it had been a stone lying loose in the left lobe of the prostate. The circumstances were peculiar, perhaps unprecedented in the history of lithotomy, and I drew the special attention of a professional brother, a near relation of the patient, who was present, to the circumstance. I felt convinced at the time that, whatever might be the result, I did the best for the patient, although his condition was critical in the extreme, and the operation was deemed a last resource. His recovery was slow, owing to previous exhaustion, but there never has been any irritation in the prostate. I do not feel at liberty to mention all the features and history of this case, but I pledge my word and name, for what may be their value, that it is worthy of being a precedent case.

The thought of being of service to any future sufferer, or any professional brother, induces me to put such experience on record in a manner more forcible than heretofore. The interests of patients and of surgeons are alike involved in these observations; and there are points or questions connected with them which, in my estimation, deserve attention from all engaged in the department of surgery to which the above remarks relate. In many cases of stone in the bladder the distress of the patient is plainly attributable to this cause; but occasionally the presence of stone produces so little irritation that its discovery is a matter almost of chance. Often, however, enlargement of the prostate gives rise to most, perhaps all, of the symptoms and sufferings of stone. When stone is combined with enlarged prostate, who can say from which cause the distress is greatest? So if it happens that the surgeon is called upon to relieve his patient from stone, and finds an enlarged prostate at the same time, why should he not, in extracting the stone, when it seems in his power, as in the cases above referred to, take away a superfluous portion of the prostate at the same time? The masses alluded to seem like adenoid tumours in the original substance of the prostate; their removal may be deemed a relief, and a possible solution of the distress of enlarged prostate; and, as the entire wound in lithotomy most generally closes by granulation, the very removal of such well-nigh isolated masses will leave less surface for inflammation, suppuration, and granulation. If allowed to remain, it is not likely that they will adhere to their former site by immediate union; if they do not, a larger surface must be exposed to the irritating influence of urine, and a double suppurating and granulating surface must be the result.

But, without speculating on such matters, I hasten to enunciate the conclusion at which this paper aims. There is a certain timidity in the practice of surgery which may in many respects be deemed becoming; and precedents are often as much prized among us as with practitioners in law. There would, however, be no progress unless some one from time to time stepped out of the accredited course; and so, with such authority as I can humbly claim, I have thus ventured to put on record what some of my professional brethren may have hesitated to do, from a fear that they have been guilty, in their operations, of perpetrating some rough mechanism not in accordance with that nicety of manipulation which is thought so essential in the performance of the master handiwork in surgery—lithotomy.—*Lancet, Jan.* 1, 1870, *p.* 1.

57.—ON PERINEAL SECTION.

By C. G. WHEELHOUSE, Esq., Surgeon to the General Infirmary at Leeds.

[The method of performing this operation, recommended in the following paper, is practically, so far as its details are concerned, a new one. Mr. Wheelhouse considers that it robs a very formidable operation of much of its difficulty, and in his own hands has led to more than usually happy results. Two cases had been operated upon, and were still in the wards of the Infirmary at the time this Clinical lecture was given; in one of which the stricture was traumatic, and the other gonorrhœal in origin.]

I regard the operation, as we are called upon to perform it in such cases as these, as amongst the most difficult in the whole range of surgery; for not only are we unable to introduce any guide into the bladder, but even the normal relations of the parts are frequently altogether altered by disease, and the track of the knife must of necessity lie in a very devious course. Moreover, unless that course, however altered and devious it may have become, be both accurately and unswervingly followed, and the urethra be *really* laid open through the entire track of the strictured portion, the operation may prove fruitless in the end, and nothing but disappointment to all concerned will come of it; the patient's condition will be in no way improved, and the operation will be regarded as an unsatisfactory one; but if, on the other hand, it is performed with accuracy and precision, and with such care as you have seen exercised, I venture to say that, in a large majority of cases, it will lead to such permanent cure that, with moderate after-attention in the occasional use of the catheter or bougie, the urethra may be maintained in a very tolerably perfect condition. The patient, then, is secured in lithotomy position, and is so placed that the light may fall full upon the perineum; the buttocks are slightly raised, that it may strike as much as possible in the line of the axis of the outlet of the pelvis. A curved staff of full size, grooved upon its convexity, is then passed down to the obstruction, and its point is firmly pressed against the stricture; in this position it is steadily maintained by an assistant until the urethra has been opened. For this purpose, operators generally use the catheter they intend to introduce into the bladder; I prefer the grooved staff for the following reasons: it is more easy to cut into; it is less liable to roll under the knife, and so cause it to slip; and there is no choking of the catheter with blood, a circumstance which not unfrequently happens when that instrument is used, and which

sometimes prevents the free escape of the urine even after the bladder has been reached, and thus leads to doubt as to whether this object has really been attained or not. I next introduce the forefinger of my left hand into the rectum, and feel for the apex of the prostate gland; having ascertained that as a landmark, I enter the scalpel, with its back to the rectum, immediately in front of the anus, and, cutting upwards and forwards, lay open the perineum. I then carefully clear the urethra where it is distended by the staff, by a few after-strokes of the knife. When I am satisfied that the urethra is quite cleared, I open it, not as is usual, by cutting upon the point of the staff, but by cutting into the groove a quarter of an inch or so above the point which is still kept firmly pressed down upon the stricture. I next seize with artery-forceps each lip of the opening I have made into the urethra, and with these draw open the canal, carefully assuring myself that the mucous membrane is included. The position of the staff is next completely altered. Taking it in my own hand, I reverse it, turn the point out through the opening I have made, and use it to draw forward, fix, and steady the urethra. If these parts are now carefully sponged, I have the interior of the canal so fully exposed to *view* that I can steadily follow its upper wall; this I do with a fine probe-director until I have cut my way completely through the stricture, and have come out into the dilated part of the urethra which usually lies behind it, or as sometimes happens, into a second or more strictures; this effected, I am generally able to pass the small director which I have been using immediately onwards into the bladder. Now, at this point I have seen the most skilful operators completely baffled; and although they have succeeded in effecting the division of the stricture most perfectly, I have known them fail entirely in their attempts to carry the catheter onwards into the bladder. Without a guide it is often a most perplexing and difficult matter to find the opening into the posterior portion of the urethra, or, when this is found, to insinuate the catheter into it by the side of the director; and it is precisely at this point that my little grooved director becomes of all-important service. Having reached the bladder with that, I turn the groove downwards; with a straight probe-pointed bistuory run along it, I make sure of the division of any further obstructing bands, and, finally, I completely open up the prostatic urethra by sliding along the groove of the director the little instrument which I now show you, the "probe-dilator," an instrument introduced by the late Mr. Teale for use in lithotomy, and thus obtain a broad metallic floor upon which I can, without any danger of failure, introduce a catheter of even the largest size.

Thus I reduce the difficulty of laying open the stricture as much as possible, by following every touch of my knife through it *with my eye*, and of securing a free passage for the catheter through the posterior part of the urethra by a most easy method of free dilatation. Finally, I retain the catheter, armed with an elastic tube, in the bladder during the early period of the healing of the wound, and thus secure a free passage for the urine for some days at least.

Let me commend this method of operating very earnestly to your notice; you will find it more speedy in the performance, and more perfect in result than any less accurate proceeding, and I venture to hope and think that you will never regret the adoption of my rules.—*British Medical Journal, Feb.* 5, 1870, *p.* 125.

58.—ON A NEW FORM OF CATHETER FOR RETENTION IN THE BLADDER.

By BARNARD HOLT, Esq., Senior Surgeon to the Westminster Hospital.

The difficulty of retaining a catheter in the bladder, even when the patient is confined to bed, but still more when he pursues his ordinary avocation, is acknowledged by all. I have long felt the necessity for a perfectly flexible instrument, not acted upon by the urine, which should be capable of being retained in the bladder without any extraneous aid, such as tapes or other contrivance, which should allow the patient to make water at will, and at the same time produce less irritation than any of the flexible catheters at present in use. I have at last succeeded in devising the instrument shown in the drawing.

It is made of vulcanised india-rubber, and has on either side a wing, or fin, of the same material, which prevents its escaping from the bladder.

Every surgeon is aware of the danger that attends the frequent ineffectual attempts to introduce a catheter, and many must have witnessed the peril that frequently arises in cases where the patient is obliged to act for himself—hemorrhage to

an alarming extent, retention of urine, false passages, abscess, and all the concomitants of such cases. It is to remedy these, and to afford perfect security in cases of retention of urine not dependent on bad organic strictures, that the present instrument has been contrived. And I am happy in being enabled to add that, although further improvements may be required, the principle on which the instrument is constructed has been perfectly successful in every case in which the treatment was advisable. Its advantages are as follows: It can be introduced with ease; it may be worn for a considerable time without requiring removal; the patient retains perfect control over the bladder; he can pursue his ordinary business with the most trifling inconvenience; and, in cases of incontinence, the offensive, but hitherto necessary, instrument, the urinal, may be dispensed with.

The following are cases in which the catheter has been worn for variable periods:—

J. H., a seaman, had been under my care for a very obstinate stricture of the urethra, complicated with fistulous openings in the perineum, through which the greater portion of the urine escaped. The stricture was treated by immediate dilatation, but the fistulæ did not heal; the urethra was subsequently incised through the openings, and a catheter was retained in the bladder. Urine, however, escaped by the side, and the treatment was unsuccessful. Three months since, and eighteen months after his operation, I saw the patient again, when I introduced the india-rubber catheter, and allowed him to continue his ordinary occupation. The catheter produced but the most trifling inconvenience, and he wore it for a month without its creating any irritation. He then began to pass water more frequently, and with some pain, when I removed it, and found small particles of phosphates adhering to the end. The catheter was not in the slightest degree damaged or altered by being so long in the bladder. As the urethra was tender, I decided to let him remain without it for a fortnight, when it was reintroduced, and I directed him to throw a small quantity of water into the bladder to prevent the deposit of phosphates. The second catheter he wore for five weeks, still continuing his employment, and removing the urine at will. When it was again removed, a slight deposit was detected on the end, but otherwise it was quite uninjured. The openings in the perineum have all but closed.

W. B., aged sixty-nine, a gentleman of active habits, has long suffered from enlargement of the prostate gland, which necessitates his introducing a catheter whenever the bladder required to be relieved. As a general rule he managed very well, but occasionally, more particularly at night, he experienced diffi-

culty in introducing the instrument, and frequently the unsuccessful attempt gave rise to hemorrhage of a rather severe kind; his rest was disturbed, and the frequent passage of the catheter kept the urethra sore and irritable. I experienced no difficulty in passing the india-rubber catheter, which was easily retained in the bladder without extraneous aid. During the first day he felt some uneasiness, especially when the bladder was empty. This, however, soon passed off, and he was enabled to empty the bladder at will. The catheter was worn for a fortnight, when it was removed, cleansed, and reintroduced. He continues to wear it to the present time.

Captain ——, who for twenty years had suffered from obstinate stricture of the urethra, and upon whom every kind of treatment had been employed, consulted me in October last in consequence of fistulous openings in the perineum, through which the whole of the urine passed. A catheter could not be introduced through the stricture; and consequently the urine was passed, after great straining, through the abnormal apertures. He is paralysed on one side, and his general health is materially affected. After repeated trials, I succeeded in passing a catheter of the smallest size, and eventually, under chloroform, introduced the dilator, and enlarged the canal. The india-rubber catheter now entered the bladder, and he passed his urine with ease. His health speedily improved, he was entirely relieved from any straining, and had the entire control of the bladder. The catheter was removed at the end of a week, and after being replaced he returned to the country. At the expiration of three weeks it was again removed, and after being cleaned was reintroduced. This time he wore it for five weeks, when it was again removed and replaced, and he continues to wear it at the present time. It gives no pain; he walks out daily as well as his lameness will permit, and his general health is good. The fistulous openings are rapidly healing.

A. B., at present an in-patient of the Westminster Hospital. Six months since he was attacked with hemiplegia of his right side, and incontinence of urine. He had lost all expulsive power of the bladder, and the urine constantly dribbled away. Upon admission the urine was removed three times a day, and the bladder was washed out with tepid water; but as he did not regain any expulsive power, the india-rubber catheter was passed, and he at once had the entire control of the bladder. He was directed to remove the urine every four hours, which he accomplished without the slightest difficulty. At the expiration of a fortnight I removed the catheter. It was not in any degree injured, but there was a slight deposit of phosphates on the end. This was removed by washing in warm water, and

the catheter was again introduced. The patient expresses himself as very much relieved; the catheter does not give pain; his general health is improved, and there is a possibility of the muscular coat of the bladder recovering its tone. This patient still wears the catheter, and may be seen by any surgeon who takes an interest in cases of a similar kind.

The above cases are sufficient to establish the principle that an india-rubber catheter of the form described may be worn for a considerable period without pain, and with the most trifling inconvenience. The wings do not irritate the neck of the bladder, as is proved by the fact that patients pass urine less frequently with the catheter in than without it. The phosphatic deposit which I have alluded to is very trifling, and I believe adhered to the end of the catheter because it was rough and imperfect. The catheters are now made in a mould, are always of the same shape and size, are perfectly smooth, and not in the least acted upon by the urine. This I proved by removing one that had been worn for six weeks, when it was found to be as perfect as on the day it was introduced. The catheters will be made in various sizes. The method of introduction is as follows:—Place the catheter on a strong stilet with a handle, and let the stilet be of such a size that it will move freely backwards and forwards inside the catheter. Cover the catheter with powdered French chalk, or, if that is not at hand, smear it with a small quantity of sweet oil. Stretch the catheter on the stilet so as to make it as small as possible, press the wings against the catheter, and gently introduce it into the bladder. Having once entered the bladder the urine will flow, when the end may be stopped by a simple peg, or, what is better, a small metal stop-cock, similar to the end of an ordinary female catheter. The patient should be kept quiet for the first twenty-four hours, to allow the bladder to become somewhat accustomed to the catheter, and, to prevent it being grasped by the bladder, the whole of the urine should not be removed. The catheter may now be cut the desired length, and, for convenience, it should not project above an inch from the meatus. The patient must have special directions to prevent the instrument being entangled in the clothes, as there would be danger of its being rudely withdrawn; and he must not retain the urine in the bladder until the desire to empty it becomes very urgent, as, should anything obstruct the eye, the instrument might be forced out by the rush of urine; this is not, however, likely to occur in cases of atony of the bladder or enlargement of the prostate gland. He should also be directed to throw in once a day a small quantity of tepid water, to keep the eye clear, the bladder free from mucus, and prevent any deposit on the end of the catheter. The catheter must be worn in obedience to the

feelings of the patient. So long as it does not produce pain or frequent desire to pass urine, it may be allowed to remain; but, as a general rule, I should advise its removal once a fortnight.

In conclusion, I may add that I believe the present instrument will confer a material benefit on those who are so afflicted as to require the removal of the urine by mechanical means, and that it will be the saving of many lives; and in this expectation I offer it to the profession. I must, at the same time, express a hope that its advantages will not be discredited by its adoption in difficult strictures, or where the common sense of the surgeon shows him it would be unsuitable. The catheters can only be obtained of Messrs. Baker, 244, High Holborn, to whose assistant I am indebted for the indefatigable pains he has taken to carry out my ideas. For the last two years I have been endeavouring at various other instrument makers to get the catheter made, but without success; and I therefore feel bound to give Mr. Baker the benefit of the sale. The principle of the wings I intend to adopt for other purposes, and I am now having a flexible india-rubber trocar made which I believe will be invaluable in all cases where the bladder requires to be punctured through the rectum."—*Lancet, Feb.* 19, 1870, *p.* 261.

59.—A NEW RETENTIVE CATHETER.

By RICHARD DAVY, Esq., London.

On March 28th, 1870, I exhibited at the Medical Society of London a new form of retentive catheter, which possesses the three essential qualities required for general use, viz.:—1. It is easy of introduction. 2. It is easy of retention. 3. It is easy of withdrawal. It consists of a French vulcanite catheter, through which a string is passed, emerging at a clean hole an inch and a half from the point, and then, bridging over the usual opening for the urine, is inserted securely at the point.

The opening for the urine is punched one inch from the point, and is on the opposite aspect of the tube to the usual hole. The handle consists of a leathern collar, with a slot in it, a knot in the string, and a plug on it.

1. To introduce the catheter. Fix it on a long stilette, well oil it, and remove stilette when the instrument is fairly in the bladder. 2. To retain it. Draw the string at the handle, fix the knot behind the slot, and use plug or not at your discretion. The effect of this is to reduplicate the terminal portion (three-fourths of an inch) of the catheter, so that No 12 in the urethra becomes No. 24 in the bladder. 3. To withdraw it. Slip the string out of the slot; the elasticity of the tube restores the end to its original straight position, and withdrawal is painless.

To render these two last-named acts (Nos. 2 and 3) distinct by an anatomical simile. Suppose the end of the catheter to be a finger, then the string is the flexor tendon, and the elasticity of the tube the extensor.

Any surgeon may now easily make his French catheters self-retentive, or they may be purchased at a small cost of MM. Mayer and Meltzer, 59, Great Portland-street, W.—*Lancet, April* 9, 1870, *p.* 532.

60.—ON THE TREATMENT OF ACUTE ORCHITIS.

By J. ROUSE, Esq., Assistant-Surgeon to St. George's Hospital.

[There can be little doubt that, as a rule, the secreting structure of the testicle is entirely unaffected in the acute orchitis following gonorrhœa; and that the disease is a diffuse inflammation of the connective tissue of the part.]

If we refer to the various authorities as to the treatment to be pursued, we are surprised at the active, not to say violent, means adopted to subdue the inflammation, the character of which (established as it is by the excellent observers quoted) seems to be quite overlooked. Mr. Curling recommends antiphlogistic treatment: "Acute orchitis, if treated quite early with nauseating doses of tartar emetic, usually subsides rapidly, so that this plan renders local depletion unnecessary." "Tartar emetic may be prescribed in camphor mixture, with small doses of sulphate of magnesia and tincture of henbane. Pain and constitutional derangement may be relieved by one or two grains of calomel, combined with eight or ten grains of Dover's powder, or half a grain of morphia taken at bedtime. In addition to these active measures, leeches along the cord, or bleeding from the veins of the scrotum, is recommended." The treatment by antimony, calomel, and local bleeding seems active enough; but it was reserved for Mr. Henry Smith to recommend a very startling method of cure.

A patient suffering from acute gonorrhœal orchitis, with an unusual amount of swelling and pain, came under Mr. Smith's notice in July 1863. From the severity of the symptoms it was thought that suppuration must have taken place, and a free and deep incision with a bistoury was made with the view of letting out the pus. To the dismay of the surgeon, a little serum and blood escaped, and the tubes of the testicle protruded through the wound. Two days subsequently the patient was quite free from pain, the swelling and redness had almost disappeared, the protrusion no longer existed. Mr. Smith was so struck by the fortunate termination of the case, that he determined to try the same treatment in other cases; and finding the method of

"making a free and deep incision" give relief to pain, Mr. Smith was led to adopt it as the usual treatment of acute orchitis. No one can doubt Mr. Smith's statement of the result of his experiment; but from what has already been stated with reference to the pathological condition of the testicle in cases of gonorrhœal inflammation, we may safely conclude that Mr. Smith's idea that "the free division of the fibrous tissue enveloping the body of the testis, and the consequent removal of tension from the organ, was the secret of success," was erroneous.

Severe and unnecessary as the treatment seems to me, I think it is to be preferred to the calomel-and-antimony treatment still in vogue; for in all Mr. Smith's cases, treated by incision no other remedies were employed, and the patient escaped all the horrors which Mr. Smith in his paper so well describes, that I am tempted to quote his words: "We all know what a terrible ordeal of violent remedies a patient with acute inflammation of the testicle has to undergo. In the first place, he is obliged to lie in bed for several days; a large number of leeches, or the constant application of ice, is necessary to relieve the pain; and at the same time the unfortunate wretch is compelled to undergo the process of severe purging and continued nausea by repeated doses of salts and tartar emetic, before any decided mitigation of his symptoms ensues."

Having thus briefly discussed the treatment usually adopted for acute orchitis, I must now lay myself open to criticism by stating that, in my opinion, the simplest, most satisfactory, and most efficient treatment is by opium. Until three years ago I was in the habit of treating all cases of gonorrhœal orchitis with calomel and opium, *i.e.*, two grains of the former with one of the latter, night and morning; and I never found it necessary with this treatment to give antimony, or to make use of local depletion. I object to antimony, not only because it is unnecessary, but also for the reason that patients with orchitis almost always complain of nausea; and it seems to me cruel to add more to the patient's sufferings than can possibly be avoided. Local bloodletting is undesirable: firstly, because it is unnecessary; and secondly, because, if the leeches be applied to the scrotum, it is often difficult to arrest the hemorrhage without causing the patient pain. In private practice there are many inconveniences connected with bloodletting in such cases, and these ought to have due weight with the surgeon. I was induced to leave off giving calomel in these cases from having observed the following case. I was sent for late one night to see a gentleman, who was said to be dying; and on my arriving at his bedside, I saw him in what appeared to be tetanic convulsions. I was told that he had been suffering

from orchitis, and that, at the advice of a medical man, he had been taking calomel and antimony, and rubbing blue ointment into the scrotum over the inflamed testicle. The suffering was so acute that the poor fellow was screaming with the pain; the pulse was 160, and there was profuse sweating. I found that he was already salivated; the testicle was enormously swollen, acutely tender (as well it might be), and looked as if suppuration was going on. Hot opiate fomentations were applied to the part, and a large dose of opium given. The following morning the pain had subsided; and finding so much improvement, I continued the opium and the fomentations. I confess I was surprised to find that in three days, without any other remedy save a purge, the pain quite vanished, and the swelling and tenderness considerably subsided. In the course of a few more days the swelling had quite gone, and the patient was able to resume his usual avocations. This case was so striking in its result, that I resolved to treat the next case I met with in the same way, and see whether the opium really influenced the course of the malady, or whether it had only been useful to allay the irritation set up by injudicious treatment. Accordingly, in the next case that came under my care, having first purged the patient with an ordinary senna draught, I commenced giving a grain of opium night and morning. The pain was quite relieved after two grains had been taken; and in three days all the tenderness had gone, and much of the swelling. I then, bearing in mind the pathological condition of the organ, prescribed twenty drops of the acid tincture of steel three times a-day; and in a week from the commencement of the treatment the patient had quite recovered. Since that time I have always treated acute orchitis on this plan. My colleague Mr. Pick, and several of my friends who have been induced to try it, have met with equally satisfactory results; so that I think I am not carried away by my own prejudice when I advocate this simple treatment in preference to the old and complicated one. The two following cases I give because they were treated in the wards of the hospital, and were seen by many persons when under treatment; they are therefore more satisfactory to bring forward than the numerous cases treated in the out-patient department.

Case 1.—W. H., aged 20, was admitted into the Belgrave ward Sept 30th, 1868, with acute orchitis. One month before admission he contracted a gonorrhœa, for which he had had no special treatment. Two days before admission he was attacked with very severe pain in the left testicle. On admission, the testicle and cord were much enlarged, and he complained of extreme pain. There was considerable effusion into the tunica vaginalis; the tongue was coated, and the bowels confined. A

senna draught was ordered immediately; and as soon as the bowels had been well opened, he was given a grain of opium night and morning, and the testicle was kept enveloped with a lotion of Goulard and tincture of opium. On the 1st October all the pain had subsided, but as there was great tenderness, the opium was continued. On the third day all the tenderness had disappeared, and the swelling had much diminished. Oct. 4th. The swelling was still subsiding, and there was no pain or tenderness. He was then ordered tinct. ferri perchloridi ℥ xx. in water, three times a-day; and on the 7th he was discharged quite well.

Case 2.—F. W., aged 17, a thin delicate boy, was admitted into Harris ward Nov. 5th, 1869, with acute orchitis. He had had gonorrhœa for three weeks previously. On admission, there was no discharge from the urethra, but the left testicle and cord were inflamed and acutely painful. After having been purged, he was given a grain of opium night and morning, and the testicle covered with hot opiate fomentations. On the 8th, all the pain and tenderness had disappeared, and the swelling had materially diminished. Tinct. ferri perchloridi ℥ xx. was ordered three times a-day; and he left the hospital quite recovered on the 13th, no fresh discharge having appeared.

In addition to the purging, which is essential before the opium treatment is commenced, I direct that the testicle should be kept enveloped in a hot fomentation of Goulard and laudanum, which is of considerable use in producing ease.

It may probably be asked, if, in all the cases I have treated, I have found the plan advocated equally satisfactory. I can answer, that I have had only one case—that of an out-patient obliged to go on with heavy work—in which I have had to modify the treatment, In that case, the inflammation, which was intense, had existed some days before I saw the patient, and I thought that there was lymph effused in the tunica vaginalis. In this case, the opium, at the end of three days, had not produced the usual effect, so I added one grain of calomel to each pill. In two days such marked improvement took place, that I was able to leave off the calomel; but this patient was under treatment for two instead of one week, which is the time I consider necessary for recovery if these means be adopted.

There is another mode of treatment I have not yet noticed: to wit, strapping of the testicle. I do not doubt for a moment that the strapping, once applied, produces considerable relief to pain; but I object to it on the same principle that I do to antimony, bloodletting, and especially to a deep free incision into the testicle, namely that it is unnecessary, and causes considerable and avoidable pain. If one application of strapping were sufficient, there would be less objection to its use; but to be of

real service, it ought to be reapplied at least once in twenty-four hours; and the discomfort of removing the straps is almost as great as putting them on, and if the surgeon does not possess the greatest delicacy of touch, the patient is much to be condoled with. As contrasting the two modes of treatment, I will briefly mention an instructive case that came under my own observation. Before I commenced the opium-treatment, I had a delicate lad with an acute orchitis, which I treated in the usual way; and notwithstanding every care, it was six weeks before he was able to resume his studies. About a year ago, he was again suffering from a similar attack. This time I treated him with opium, followed up by the tincture of the perchloride of iron; and in one week he was about again. The last attack was not at all less severe than the first; but the difference of the result may be entirely attributed to the treatment.—*St. George's Hospital Reports, Vol.* iv, 1870, *p.* 251.

61.—ON THE TREATMENT OF INCONTINENCE OF URINE IN CHILDHOOD AND YOUTH BY COLLODION.

By Sir D. J. CORRIGAN, Bart., Physician in Ordinary to the Queen in Ireland.

[The treatment of this painful affection may be divided into the constitutional and the local. Mechanical means of treatment hitherto used are difficult or impossible to be carried out, and blisters, copaiba, belladonna, and preparations of iron are very uncertain and unsatisfactory.]

Long time since I tried to close the opening of the prepuce with adhesive plaster, or court plaster, and in one case, that of a young man of twenty years of age, who had entered the army, and who was intelligent and careful, the result was favourable, but there were great difficulties about it. The application took time, and could not be carried into successful effect with boys and children.

The mechanical treatment to which I now wish to draw attention is the treatment by collodion. It is most easy of application, occupies scarcely a minute, and can be carried out at school, college, or elsewhere, in perfect privacy.

All that is necessary is, while the prepuce slightly curved up is held with the left hand, to smear over the little cup thus formed by the extremity of the prepuce with collodion by means of a small camel's hair pencil or blunt end of a penholder. Almost as fast as applied the collodion solidifies. In contracting it draws closely together the edges of the prepuce, and thus the exit for the escaping urine is closed.

A boy of eleven years of age has, after one lesson, been able to use the collodion, and has used it every night carefully and diligently, so anxious has he been to cure himself of what he considered a disgrace. A fortnight's use is sometimes sufficient for the cure. A relapse is easily dealt with. A solution of gutta-percha in chloroform would seem at first sight to be equally applicable, but it is not. The solution of gutta-percha is much longer in hardening, and it possesses no contractile powers.

When the child or youth desires to pass water the little wedge or cap of collodion is easily removed with the finger nail.

When I first used this collodion application, my expectation was, that the bladder would act so forcibly against it as to cause sudden pain, and oblige the patient to jump at once out of bed and quickly remove the collodion, and that he should then repeat the application before returning to sleep.

I was agreeably disappointed. There was no pain; no awaking; but on rising in the morning the prepuce was found slightly distended with urine, and the collodion was removed without difficulty.

This unexpected result would lead us to infer that the action of the muscular contractile fibres of the bladder has little to do in causing the nocturnal incontinence of urine in childhood, and that the escape of the fluid is rather due to want of opposition in the sides of the canal of the urethra, or to a feeble state of the circular fibres which are supposed to constitute the sphincter of the neck of the bladder.

Acting on this view I have recommended the child's bed to be made in such form as that while preserving the usual slope for head and shoulder, the rest of the bed shall gently rise as an inclined plane, from hips to feet, so as to allow the urine in the bladder to gravitate towards the fundus, rather than towards the trigone.

In all the instances in which I have used the collodion application the prepuce has been, as, I believe, is nearly always the case in children and boys, projecting over the glans, or in a state that may be designated as natural phimosis. But I do not anticipate any difficulty in using the same application in cases where the corona glandis might be exposed, as the collodion would, I should expect, act equally well over the orifice of the urethra as over the opening in the prepuce.

It may be presumption, but I cannot conclude without expressing a strong opinion against one part of the management of these cases, which is very frequently practised through the best motives on the part of mothers and nurses, and sanctioned by the recommendations of some medical authorities—the practice of awaking the child at stated intervals to pass urine.

I have never seen any benefit whatever from it, and I think I have, on the contrary, always seen aggravation of the affection from it, not unreasonably to be explained, on the principle that such practice is really training the bladder to empty itself at stated periods, when the object is that it should be trained to retain its contents.—*Dublin Quarterly Journal, Feb.* 1870, *p.* 113.

DISEASES OF THE SKIN.

62.—ON THE THERAPEUTICS OF CHRONIC DISEASES OF THE SKIN.

By Dr. McCall Anderson, Professor of Medicine in Anderson's University, Physician to the Royal Infirmary, and to the Dispensary for Skin Diseases, Glasgow.

If itching is a marked feature (and, for the present, we leave out of consideration diseases dependent on parasites, such as scabies—the itch—which require special treatment), we may expect to derive benefit from the use of *empyreumatic oils or their derivatives.* It is right to warn you, however, that, in exceptional cases, these increase the irritation to an intolerable extent; but in the majority they not only relieve the itching, but are decidedly curative, especially in chronic erythema, chronic eczema, and psoriasis (although more slowly), while in prurigo they give immense relief. It is well to know that in some persons, with sensitive skins, their application produces all the phenomena of dermatitis (burning heat, redness, swelling, and sometimes an eruption of vesicles and bullæ). Their long-continued use, too, produces, in all persons, though more speedily in some than in others, an inflammation at the orifices of the hair follicles: papules and pustules make their appearnce, which present this peculiarity, that in the centre of each spot a black, tarry point is observed. This eruption has been called tar acne by Hebra. Some time ago I prescribed for a little girl, who was affected with slight chronic eczema of the leg, a lotion containing one of the empyreumatic oils. About six weeks afterwards her mother brought her to me again, the lotion having been continued regularly in the interval, and informed me that the disease was a great deal worse. On examining the part, I found that the eczematous eruption had quite disappeared, and that its place was taken by an eruption of tar acne. The lotion was discontinued, and the artificial rash rapidly subsided.

The empyreumatic oils with which I am most familiar are, first, Pix liquida, or common Wood-tar, of which Guyot's solution of tar is a purified form, and possesses these advantages,

that it mixes with water in all proportions, does not emit such a pungent odour, and does not discolour the skin to the same extent; second, Coal-tar (Pix mineralis), of which the best form is the liquor carbonis detergens of Wright and Co., a solution which forms a creamy emulsion with water; third, Oil of Cade (Oleum Cadini), which is the product of the dry distillation of the wood of the *Juniperus oxycedrus;* fourth, the Oleum Rusci, which is obtained from the bark of the *Betula alba*, or white birch. The odour of the last two is not so pungent or disagreeable as that of the others, but they are more expensive, and therefore less adapted for dispensary practice.

These preparations may be employed alone—in cases of chronic psoriasis, for example, after the removal of the silvery scales—in which case they should be rubbed into the affected parts, twice a day, as firmly as possible short of causing pain, or as lotions or ointments, as in the following prescriptions:—Guyot's solution of tar, soft soap, rectified spirit, of each one ounce; spirit of rosemary, one drachm: mix. Wash off before each reapplication.—Nitric oxide of mercury, one scruple; nitrate of mercury ointment, one drachm; oil of white birch bark, one drachm and a half; benzoated lard, four drachms: mix.

Two other remedies of this class must be mentioned—namely, Creasote and Carbolic acid.

Creasote may be added to ointments, in the proportion of from five to ten grains to the ounce, for the purpose of allaying irritation of the skin. In cases of chronic psoriasis a strong creasote ointment was recently recommended by Mr. Balmanno Squire, and I have found it very useful, although it is sometimes too irritating. The following is the form of ointment he employs:—Creasote, two ounces; white wax, one ounce: dissolve. Rub very firmly into the eruption night and morning after the scales are removed.

Carbolic acid has a less disagreeable odour than the tarry preparations, and is more cleanly. It is soluble in water with the aid of a little glycerine or spirit, and forms a colourless solution. For these reasons it can often be used when tar is inadmissible, as when an eruption is situated upon an exposed or a hairy part; but it must be admitted that, as a rule, it is not nearly so effectual as the empyreumatic oils. The following is a form in which I frequently prescribe it:—Crystallised carbolic acid, two drachms; Price's glycerine, six drachms; rectified spirit, four ounces; distilled water, one ounce: dissolve. Sponge the affected parts two or three times a day, and also when itching is complained of. This solution is of use in cases

of chronic erythema, chronic eczema, and the like, and not only relieves irritation of the skin, but also is directly curative.

Potash applications have of recent years been brought prominently under the notice of the profession by Hebra. They are of use in favouring the removal of abnormal products—*e. g.* the scales of psoriasis,—and in many cases they favour the cure of the eruption in virtue of their stimulating effect, especially in combination with other remedies, such as tar.

Those which I am most in the habit of using are, potash soap black soap—sapo mollis), liquor potassæ, and solutions of potassa fusa varying in strength from two grains to a drachm to the ounce of the excipient. I shall refer to stronger solutions under the head of Caustics. A few illustrations may be given of their use.

In cases of tinea versicolor, that brown scurfy eruption which attacks the covered parts of the body, due to the presence of a fungous growth, the Miscrosporon furfur, and of which we have already had several illustrations, we can effect a cure by scrubbing the *whole* of the eruption night and morning with black soap or its solution in spirit. The soap acts as a stimulant, but is chiefly serviceable owing to mechanically removing the scales which are loaded with the fungous matter. But the cure may be accelerated by the use of one of the so-called parasiticides, which can be combined with the solutions of black soap as follows: Perchloride of mercury, twelve grains; black soap, four ounces; rectified spirit, two ounces: dissolve, and add oil of citronella, one drachm. Rub, night and morning, as firmly as possible into the whole eruption short of causing pain.

Again, potash applications are useful in cases of chronic eczema, not only by removing morbid products and allaying irritation, but also by stimulating the parts and favouring the removal of the infiltration of the skin when it is marked. For this purpose I generally employ solutions of potassa fusa, and vary the strength of the solution according to the amount of the infiltration and the extent of the disease. It should be rubbed into the affected part with a large paint brush, or with a small sponge provided with a handle, until decided smarting and excoriation result, when its action may be stopped by washing with water and applying a soothing ointment. If the surface is left alone after the application of the solution, it is soon covered by an immense number of gelatinous drops, showing the extent to which it has been stimulated. After the effect of the first application has passed off, it may be repeated, and the treatment continued until the infiltration of the skin is gone, when the cure may be accelerated by the use of some other application, such as the oil of cade, or the like.

Lastly, in cases of chronic general psoriasis, Hebra's modification of Pfeuffer's treatment may prove effectual. This consists of rubbing soft soap into the whole of the eruption twice a day for six or eight days, each patch being on one occasion rubbed so hard as to remove the scabs entirely and to cause slight bleeding. During this time, and for a few days thereafter, the patient lies in bed enveloped in blankets, after which he takes a warm bath and dresses himself. The treatment often requires to be repeated, and is only successful in a few cases, for which reasons, and also owing to the pain which it produces, and the necessity of confining the patient to bed, it can seldom be carried out in private practice.

Mercurial applications are often of service in simple inflammations, although not to the same extent as the preceding remedies; while in syphilitic affections they are almost indispensable. If itching is a prominent symptom, they may with advantage be combined with one of the empyreumatic oils. Those which are most valuable are corrosive sublimate, calomel, white precipitate, red oxide, and red and green iodide of mercury, and ointment of nitrate of mercury, not to speak of the well-known yellow and black washes of the Pharmacopœia. A few illustrations of their use as powders, lotions, and ointments may be given.

In cases of syphilitic condylomata, at the anus we shall say, Ricord's treatment is very effectual. This consists of washing the parts twice a day with solution of chlorate of soda, drying them, dusting them with calomel, and separating them with a piece of clean dry lint.

Again, in cases of acne and in chronic erythema of the head (pityriasis capitis, as it is often called), the following lotion is of use:—Perchloride of mercury from twelve grains to one scruple; Price's glycerine, four drachms; rectified spirit, five ounces; spirit of rosemary, one drachm; cochineal, one grain: mix and strain. Dip a piece of sponge or flannel into the mixture, and rub firmly into the part night and morning.

In a recent very able article by my friend Dr. Moriz Kohn, of Vienna, on Lupus Erythematodes, the value of emplastrum hydrargyri in that affection is referred to; and I can amply corroborate his experience of it in the treatment of this and of allied affections. A piece of lint the size of the part is spread with the melted plaster and applied, and changed once in twenty-four hours.

Lastly, when we have to deal with patches of dry eczema (eczema siccum), or of psoriasis, and, above all, when we have to treat dry syphilitic eruptions, the following ointment may be used:—Subchloride of mercury one drachm; ammoniated mercury ointment, two drachms; glycerine (Price's), one drachm;

simple ointment to one ounce: mix. Rub firmly into the eruption night and morning.

It must never be forgotten that all kinds of mercurial applications are to a certain extent absorbed, and hence you must warn your patient of the possibility of salivation, especially if you do not see him often, and if a considerable extent of surface is being acted upon.—*Lancet, Dec.* 4, 1869, *p.* 763.

63.—ON PRURITUS SENILIS.

By Dr. McCall Anderson, Professor of Medicine, Anderson's University, Glasgow.

A gentleman, aged about sixty-five, of a spare habit of body, whose general health was fair, with the exception of a marked tendency to constipation, and who had the advantage of plenty of out-door exercise, consulted me on account of intolerable itching over the whole body, that malady which is described under the title of pruritus senilis, and which has no connexion, as some would have us believe, with phtheiriasis corporis, the disease due to the presence of lice, and which is so common in old persons. His skin was the seat of a pruriginous eruption, the result of the scratching in which he indulged, and the irritation of the skin interfered much with his sleep. After a trial of other means, which were only very partially successful, he procured, at my request, a complete underdress of vulcanised india-rubber cloth, on commencing to wear which the itching and eruption completely disappeared.

This treatment is useful also in cases of prurigo and ichthyosis, and probably in most obstinate localised eruptions. It possesses this advantage, too, that it does not interfere with the simultaneous use of other local applications. The dressing often proves curative, even when the patient is only able to make use of it at night; but of course it is more quickly and more certainly successful if it is worn continuously. It should be removed from time to time for the purpose of cleansing it, and of wiping the skin; and if, as often happens, the tender skin in the vicinity of the eruption is abraded and raw, a little benzoated zinc ointment may be applied with advantage.—*Lancet, Dec.* 18, 1869, *p.* 834.

64.—ON THE CONSTITUTIONAL TREATMENT OF DISEASES OF THE SKIN.

By Dr. McCall Anderson, Professor of the Practice of Medicine in Anderson's University, Glasgow.

A disease which is purely local cannot be benefited by any internal medicine (except arsenic, which acts specially upon the

skin), while local treatment is almost always preferable to it. On the other hand, if an erruption is symmetrical—thus indicating, as a rule, its constitutional origin,—or diffused over an extensive surface, it is much more likely to yield to constitutional treatment. Again, if an eruption is coming out rapidly, even when there is constitutional reaction, it generally requires what is denominated a cooling treatment, and is likely to be aggravated by the use, at the outset, of iron, arsenic, and such remedies. It must also be borne in mind that if any derangement of internal organs, of the kidneys, digestive organs, &c., complicates a skin affection, remedies specially directed against the skin disease—tonics, for example—are almost certain to aggravate it.

As long as an erruption continues decidedly to improve, and if the general health is not suffering from the use of the remedy, no radical change should be made in the treatment; but if, as sometimes happens, the patient tires of the long continuance of one prescription, the remedy may be given in another form. Further, if a particular medicine is decidedly indicated, and if the patient starts objections to it without good reason, and if you are of opinion that no other medicine has any chance of being equally effectual, it is sometimes allowable to give it in a concealed form. (It is in order that the patient may not know that he is taking opium that the name of the opium pill of the Pharmacopœia has been changed from "pilula opii" to "pilula saponis composita.")

In conclusion, let me say that the most judicious treatment is very apt to prove abortive if the diet and regimen are not carefully attended to, in regulating which you must be guided by broad general principles. But let me warn you—and this is a point which is too often ignored,—that sea-air and sea-water are very apt to prove prejudicial in the subjects of skin affections, with the exception, perhaps, of those labouring under strumous diseases.

Purgatives or aperients are of service in at least one-fourth of all skin diseases, at the outset at all events; and many can be cured by the exclusive use of them. This is especially true of the eczematous group when seen in the early or acute stage, and when associated with digestive derangement or constipation. In doubtful cases it is safer to inaugurate the treatment with aperients; but it must never be forgotten that where debility is well marked, or where there is a decided tendency to ulceration, great caution is required in the use of purgatives. In the employment and selection of purgatives and aperients we must be guided by general principles.

A very excellent aperient is the well-known sulphate-of-magnesia and sulphuric-acid mixture; to which, if there is a gouty

tendency, a little wine of colchicum, or, if anæmia, sulphate of iron, may be added as follows :—Sulphate of magnesia, three ounces; dilute sulphuric acid, an ounce and a half; sulphate of iron, three drachms; simple syrup, six ounces; syrup of ginger, one ounce; infusion of quassia to twenty-four ounces: a tablespoonful, in a good deal of water, three times a day.

Another very useful tonic aperient, especially if the bowels are easily moved, and if there are indications of nervous debility, is the following :—Phosphate of soda, three ounces; dilute phosphoric acid, two ounces; syrup of ginger, six ounces; compound infusion of gentian, eight ounces; distilled water to twenty-four ounces: shake the bottle: a tablespoonful, in a large wineglassful of water, to be taken three times a day.

In each case the dose must be so regulated that the bowels are kept freely open. If purging is induced, it must be diminished; while, if the bowels are not acted upon, a pinch of sulphate of magnesia may be added to each dose in the case of the first prescription, a little phosphate of soda in the second.

In acute cases, one or two full doses of calomel, followed by castor oil or a seidlitz powder, is often beneficial at the outset; but prolonged purgation must in every case be avoided, for although it may remove the eruption for a time, it returns whenever the treatment is stopped, and, by weakening the patient, may indefinitely prolong the disease.

We are told that sulphur is the great blood depurant in the case of diseases of the skin; but, for my part, I have as little faith in it when administered internally as when used as a local application. When it does good, it is generally in virtue of its purgative action; while it has this drawback, that it is converted into sulphuretted hydrogen, so that the secretions have a disagreeable odour. It is usually given in electuary with acid tartrate of potash, but it is better to prescribe one of the natural mineral waters containing it; and the fact that some of these do not act as purgatives must not be taken to disprove my assertion with regard to the *modus operandi* of sulphur, for the benefit which accrues may be due to the combination of salts held in solution. Those of Harrogate and Moffat in this country, and of Aix-la-Chapelle, Enghien, Barèges, and Luchon on the continent, have the greatest reputation in this respect; and while some of these waters may be had from the chemist, it is always more judicious, when it can be effected, to send the patient to the spring itself, for he is thus certain to get the waters fresh and pure, and, away from home and the fatigues and anxieties of business, his body is at the same time invigorated and his mind refreshed.

Diuretics are indicated if the kidneys are torpid, especially in the treatment of the erythematous and eczematous group and

in acute cases. Their diuretic action, however, does not always account for the good result observed: thus alkaline diuretics, such as the bicarbonate of potash, or neutral (which in the system are converted into alkaline) salts, such as the acetate of potash, probably do more good in virtue of their alkaline reaction. And this leads me to remark that *alkaline medicines* are especially useful in the treatment of skin diseases occurring in rheumatic and gouty subjects, and in persons who are martyrs to acidity, or in whom there is a tendency to the deposit of uric acid and of urates in the urine. The alkaline and neutral preparations which are most used are salts of potash, such as the acetate, bicarbonate, and citrate; but, if a stimulant is required, I generally prefer the carbonate of ammonia; and it will often be found of advantage to combine these remedies with arsenic, or, if there is a gouty tendency, with colchicum: —Carbonate of ammonia, one ounce; solution of arsenic, three drachms; syrup of ginger, six ounces; infusion of cascarilla to twenty-four ounces. A tablespoonful in half a tumblerful of water three times a day, after food.

It must never be forgotten that alkalies should be given largely diluted, and also some time before food, for although the administration of a small quantity of an alkali seems to cause an increased flow of gastric juice, a large quantity may neutralise its acidity. The dose should be so regulated as to keep the urine constantly alkaline as tested with litmus paper; and the medicine should be steadily continued, unless it disagrees, until some time after the disease has disappeared.

Sedatives and narcotics are indicated under the same circumstances as in the treatment of disease of other organs. But let me remind you—and the remark applies not merely to skin diseases—that sleeplessness is often the result of debility, in which case tonics, especially iron and arsenic, are the best narcotics. Sedatives and narcotics are of no use for the relief of irritation of the skin, except in so far as they may induce sleep; indeed if they derange the stomach they are very apt to increase the irritation.

But, as is well known, opium in small doses, frequently repeated, is of value in the treatment of affections of the skin occurring in broken-down subjects, especially in cases of ulceration; but then they do good in virtue of their stimulating, rather than of their narcotic, properties.

In genuine cases of urticaria perstans, that is nettle-rash, recurring from day to day, and from week to week, when it is independent of local causes, and when no constitutional derangement (disorder of the digestive organs or the like) is present, sedatives are sometimes curative, especially bromide of potassium in full doses.

Lastly, it need only be mentioned that the neuralgia which so frequently accompanies and follows attacks of zona (shingles) is best relieved by the subcutaneous injection of morphia.

Cod-liver oil is indicated in the treatment of strumous diseases of the skin, although it is of more value in preventing fresh outbreaks than in removing existing manifestations.—*Lancet, March* 19, 1870, *p* 401.

65.—THE TREATMENT OF THE TINEÆ, OR RINGWORMS.

By Dr. TILBURY FOX, Physician to the Skin Department of University College Hospital.

[Although fungi are undoubtedly the cause of the lesions of the hair and epithelium peculiar to the tineæ, we ought to remember that tineæ do not flourish on healthy surfaces. Persons attacked by tineæ always assimilate very tardily, and are generally deficient in fatty matter. This must be attended to in the treatment of the case. A large amount of fatty matter should be taken as food, or in the form of cod-liver oil.]

It is not so necessary to crop off the hair in tinea decalvans, because the loss of hair is so conspicuous that it at one indicates the seat and extent of disease; but the same rule as to the necessity of using remedies beyond the limit of the apparent disease is doubly needful in this variety of tinea. Well, having cut short the hair, we are enabled to see the contrast at once between the upright and shining hairs of health with their connected healthy scalp, and the dull, brittle, twisted and broken off hairs and the scaly or inflamed scalp of disease. If there be much crusting as in favus, or scaliness as in tinea tonsurans, we have recourse to cleansing by poulticing and rubbing in oil, and then we may, to destroy the fungus germs free about the surface, keep the scalp bathed in a solution of hyposulphite of soda ʒss. to ʒvj. of water, or sulphurous acid one part to four or six of water. In this way in a couple or three days we have a perfectly clean surface, and we can then see the exact extent of disease in contrast to the healthy parts, of course. In the slightest cases, and in ringworm of the non-hairy parts, this preparation is needless, save, as before observed, in regard to clearing the hair away from actual diseased spots.

Secondly. We should take measures to prevent the dissemination of the disease from spot to spot by the transplantation of spores and spore tubes. This is effected by observing scrupulous cleanliness, by using parasiticides to the whole scalp if the disease is severe, and by oiling the scalp also. The collection of scales must be prevented also. I am in the habit of telling nurses or parents to care for these cases of ringworm thus.

The parasiticide application is to be applied say twice a day; that is, in the morning, after the head has been carefully cleansed and washed with soap and water, and at night. After each time of using the parasiticide the scalp should be pomaded over lightly, or covered with rag wetted with a solution of the sulphurous acid or the hyposulphite of soda. Ordinary oil or pomade may be quite as efficacious in some cases, provided it be fairly applied so as to grease the scalp.

Thirdly. We should in marked cases get away as much of the fungus as we can, and that bodily—bodily with the hair, where that exists, and when it is loaded with the fungus germs. This leads us to the question of epilation. Now in the three tineæ which attack the scalp—t. favosa, t. tonsurans, and t. decalvans—epilation is called for. This statement is in contradiction to the general teaching on the subject, but I know that it is true. In favus the application of parasiticides must go hand in hand with epilation, an inch or more of the scalp being cleared of its hair each day. In tinea tonsurans many of the hairs are brittle, and break away when we attempt to pull them out; but many others are actually removed, and the attempt should be made to get as many away as possible, and as in the case of favus a certain area should be cleared each day, parasiticides being used after each sitting. I feel sure that a very erroneous idea is abroad that epilation is useless in tinea tonsurans. If the hairs are not very loose, and the epilation gives rise to pain, it is then advisable to rub in the oil of cade freely, once or more, or to blister the diseased spots, when the hairs are loosened and can be readily extracted. But it must be remembered, both in favus and tinea tonsurans, that some of the fungus elements may be left behind in the follicle, and growing up into the hairshaft leads to disorganization of the hair; under these circumstances the hairs must be again removed by epilation. In tinea decalvans we often see short, club-like broken off hairs around the extending edge of the disease; these are to be carefully extracted, for they contain the fungus elements. They are almost invariably overlooked. In tinea sycosis epilation is absolutely needed. It is very important indeed, I think, when tinea tonsurans is in progress, to remove the short dark stumps of hairs which sometimes abound over the diseased patches. These stumps have loosened their attachment to the papillæ, and are like so much dead matter upon which the fungi luxuriate. They are always loaded with spores of large size, and are as so many laboratories, capable of disseminating the germs of disease far and wide. What we need to do in addition to killing the actual fungus is to prevent its re-growth in the part from whence it has been exterminated. But, speaking of epilation as a whole, how long or how many

times is it to be repeated? The microscope and the general aspect of the disease must guide us. If the hairs which spring up over a patch look diseased; if they are brittle and loaded with spores; if the formation of the root-sheath of the hair is destroyed and the root itself be invaded by the fungus, then we must epilate and use parasiticides again—it may be twice, it may be three times. This brings us, fourthly, to *the use of parasiticides*. Where the disease affects the general surface of the body, we at once start in the treatment with these remedies; but where the hairy parts are implicated, save in the slightest cases, the employment of the preparatory measures above described is requisite. Now there must be some distinct principle upon which we should use these agents. Our object is to bring them into contact with the parasitic elements, and this in the slighter forms of disease is readily done by friction, or by using, as a *medium* for their exhibition, some fluid that penetrates the tissues. In severe and long-standing cases epilation is absolutely needed to be practised so as to clear away the plugging up of the follicles by the diseased hairs.

Taking the general run of cases, I think the lesson we need to learn in regard to them is the use of friction, with ointments of a weakish description *quoad* the parasiticide with epilation when this is called for, rather than the application of strong and active remedies; at least I have seen many bad results from the too free and too frequent use of strong and perhaps vesicating parasiticides. If we employ the latter, it should be *occasionally* but *effectually*. I have had under my care cases in which the greater number of the follicles of the scalp have been inflamed simply from the use of strong remedies repeatedly applied; sometimes there has not been a vestage of fungus present, the inflammatory state of the follicles being taken for an aggravation of the tinea; microscopic examination should have settled the difference in a moment. Let me take the varieties of ringworm in detail, and the simplest first. Chloasma: this is very easy of cure by the use of a lotion of ʒss. of hyposulphite of soda in ʒvj. of water. The skin should be first washed with yellow soap and water, and the lotion at once applied—the part being frequently dabbed with it. The lotion should be continued for some time, a fortnight in severe cases, after the eruption has disappeared. The use of the soap and water is to get rid of the natural fatty matter, so that the watery lotion can act efficiently. It is a good plan to sponge the skin just before using the lotion with a little weak vinegar. If the tinea versicolor be very old and extensive, it may be advisable to soften up the desquamatory patches by rubbing on a little liquor potassæ. I have cured cases at a sitting by the use of liquor potassæ first, and then a strong sulphurous acid lotion.

Tinea circinata is an easy affair to cure. A solution of caustic in the spirits of nitric ether—in the proportion of two scruples to an ounce—or even tincture of iodine, or acetic acid applied once or twice, will frequently suffice. I prefer the use at the first of Coster's remedy; that is to say, a drachm of pure iodine dissolved in an ounce of oil of petroleum, or oil of tar, to be followed after the clearing away of the scab which forms—that is, in two or three days—by an ointment of ammonio-chloride of mercury, from ten to thirty grains to an ounce.

In the case of so-called "eczema marginatum," which affects the inner and upper parts of the thighs, I use a washing with soft soap, and the use of hyposulphite of soda lotion, or an ointment of bichloride of mercury four to six grains, and creosote three or four drops to the ounce of lard. But I lay great stress in all these cases on the removal of the normal fatty matter by soap before using parasiticides, if in solution.

Birmese ringworm, which affects the pubes, the axillæ, and other parts, often appearing as raised erythematous circles in connexion with what might be termed erythema circinatum about the body, is best cured—and I have had several bad cases of the kind—by the repeated use, four or five applications, of the iodine and tar application before referred to, using at the fag-end of the treatment an ointment of the pyroligneous oil of juniper and ammonio-chloride of mercury. In true parasitic sycosis epilation is called for, and then a parasiticide may be used at same the time. I know nothing better than the bichloride ointment. The microscope must be constantly used to determine when the destruction of the parasite is effected, and the hair-forming apparatus is doing its work fairly, lest we produce irritation that is taken for an increase of the disease.

But let us turn to the cases where the scalp is affected. I have already spoken of epilation being necessary in all varieties, and have defined the conditions under which it is to be practised. I should add that in tinea kerion—that variety in which the hair follicles are inflamed and the disease-patch is swollen and boggy-like—the hairs being loosened and coming away in the albuminous discharge, it is best to extract what hairs are loosened.

Well, in severe and recent cases we should make at the outset, after having got a clear surface to work at, a free and effectual application of some strong parasiticide. In favus and in tinea tonsurans, where the hairs are not partly loosened, I often use an alcoholic solution of bichloride of mercury, in the strength of two scruples of the latter to about six drachms or an ounce of the spirit. This is gently brushed over the part and blistering ensues; the hairs then become loosened the next day or so, and can be removed. The application causes pain, and should not

be repeated, if it seem desirable, for some days. Another plan is to paint over the diseased patches Coster's paint—the iodine and tar before mentioned—and this may be done, say, two or three times, at intervals of four or five days, the black scab which forms being removed for the purpose.

But we should be on our guard against these remedies, if their use is followed by the appearance of many or the persistence of little pustular heads, or any pustular eruption, and I do not think they should, as the rule, be used to cases of tinea kerion or to tinea decalvans. But how are we to proceed in severe cases? Why, I believe that really satisfactory subsequent treatment must be based entirely on *microscopic* examination. So long as there are loosened and brittle hairs, or hairs loaded with fully-sized spores, we must use strong parasiticides, but with this caution, that we be on the look-out for the presence of much effusion or pus into the follicle, as evidenced by the masses which come away attached to the hair-shafts. It is also to be remembered, that whilst we may roughly guess the progress of the disease by the look of the hairs, for they will be inclined to grow straighter and more in their natural direction, and not in a twisted one, when less invaded than before with fungus, yet the microscope can alone tell us whether the fungus germs are still plentiful in the follicle, and are being carried up through the papilla into the growing shaft. When we find, however, the hairs looking more healthy, and an attempt to form better roots and less fungus in the follicle, we must seize the moment just short of that time when "irritation" is about to occur and weaken our parasiticides. I am never disappointed with a weak bichloride of mercury ointment or the one used for itch—sulphur ʒ ss.; white precipitate ♏ vj.; creasote gutt. ij.; and lard an ounce. This should be rubbed in freely and not smeared on to the spots; that is the secret of its success. So long as the microscope detects spores in the follicles or the hairs, so long should we continue it. Oftentimes, in severe cases, by the above plan of treatment, cases will last for only half the usual period. In tinea kerion, the milder forms of parasiticides, such as a lotion of sulphurous acid or the last mentioned ointment, will rapidly aid the cure. In tinea decalvans, if the disease is acute and in rapid progress, I apply Coster's paint to the extended edge of disease, and for half an inch or so beyond its boundaries, and then use very freely an ointment of bichloride two or three grains to the ounce, extracting all short stumps of hairs, and whenever these appear I use the stronger parasiticide. When the progress of the disease stops, and young and new hairs appear, then a stimulating plan of treatment is called for. Sometimes the scalp gets puffy; the application of tincture of iodine every other day does good in these

instances. In some old standing cases of tinea tonsurans, the disease becomes reduced to two or three smallish spots about the crown of the head, and may be felt and seen according to the nurse's or parent's account, as little "knotty," or "scurfy" places. On examination we find a little erythematous patch the size of a threepenny piece or more, scaly, or slight crusted, perhaps tender, and it may be showing one or more pustular heads. We may possibly detect, in some cases, short broken off hairs or the fungus elements; if so, we must simply epilate and use a strong ammonio-chloride of mercury ointment. But in other cases no trace of fungus can be seen, and these are they in which the yellow pustules are found. I have now seen many of them; they are instances of folliculitis, induced by the long-continued use of irritating applications, and only need to be let alone, save using some slight astringent, to get well. The treatment of secondary eruptions, eczema, pityriasis, and the like, must be conducted in the ordinary manner, and baldness prevented and the re-growth of the hair be encouraged by friction with some stimulant wash; in tinea decalvans, none is better than tincture of lytta six drachms, distilled vinegar ℥iss., glycerine ʒ ij., tincture of nux vomica ℥ss., and rose water to six ounces, to be used with friction night and morning. My chief object in running over the treatment of ringworms is to impress upon practitioners the paramount necessity of a constant appeal to microscopic appearances as the best guide to the effects produced by the use of parasiticides. It not unfrequently happens, that the use of parasiticides is either not sufficiently pushed where the disease is making rapid progress, or is employed in cases where the results of the irritative action of parasiticides in the follicles are mistaken for a continuance or aggravation of the disease. Further, I wish to point out that we do not employ friction sufficiently in connexion with the applications we make of parasiticides.—*Practitioner, March* 1870, *p.* 134.

66.—THE PATHOLOGICAL PHENOMENA ACCOMPANYING NEUROSIS OF THE SKIN.

By Erasmus Wilson, Esq., F.R.S.

[A lady 70 years of age, somewhat plump in person, and of healthy appearance, consulted Mr. Wilson on account of intense and increasing pruritus. The skin was well nourished and healthy in appearance with the exception of erythematous blotches, somewhat related to urticaria, hyperæmic papulæ, and scattered vesicles, ranging in size between one line and three.]

Looking to the diagnosis of this case, it was clear that it was one of neuralgia cutis, accompanied not only with the papulæ and peculiar stinging pains of prurigo, but also with the evanescent erythematous blotches of urticaria, and, besides these, with the vesicles of herpes. And there was pretty clear evidence presented of the mutual relations subsisting between prurigo, urticaria, and herpes, and of the dependence of these forms of disease upon disturbed innervation.

The medical history of the lady showed her to have been the victim of nervous debility for the greater part of her life. In her younger days she started at sudden sounds and sudden appearances; the movement of her cap-string would make her turn round in alarm, believing that some one was approaching her; and yet she has had and reared a numerous family. At one period she was confined to her bed for many months with an attack which seemed to be partly neuralgic and partly rheumatismal; and on another occasion it was thought necessary to administer morphia by subcutaneous injection for the relief of neuralgia. And although she states six months to have been the period of duration of the present attack, it has really been in existence in a less degree for two years

With the preceding history of the patient's health before me, I prescribed citrate of iron and quinine; then, quinine with sulphate of magnesia in infusion of roses; next, liquor arsenicalis, at first in three and then in nine-minim doses three times in the day; afterwards two grains of quinine every two hours; together with bromide of potassium, hydrochlorate of ammonia, the compound soap pill with henbane, and liquor opii sedativus, twenty to thirty minims at bedtime, with thirty to sixty minims of tincture of henbane and one drachm of syrup of poppies; while, locally, she was anointed with zinc ointment and carbolic acid, and unguentum staphisagriæ; sponged with lotions and liniments of tar, and creosote; and emulsion of bitter almonds, with hydrocyanic acid. Lastly, upon a sudden aggravation of the symptoms, and under the torments of itching, the skin was painted with tincture of iodine, and with a solution of nitrate of silver in nitric ether, rising in strength from ten to fifteen grains to the ounce.

Like most neurotic affections, there were periods of comparative ease and periods of intense aggravation; and the general irritability of the whole system was greatly increased by nights of restlessness and perpetual stinging. On one occasion, when the pruritus in the legs, with blotches of papulous and tumescent erythema, and clusters of small bullæ, was more than ordinarily severe, I enveloped the limbs in waterproof lawn with temporary relief, but without any real benefit; and the treatment was succeeded by some degree of œdema, which continued for several

days. But with this exception there has been no œdema of the integument, only a slight degree of swelling, originating probably in cell-distension.

Having in my mind a strong conviction of the neurotic seat of the disorder in this lady's case, and having failed to procure any relief from the already mentioned remedies, the liqour arsenicalis having disagreed with the stomach and requiring to be discontinued at the end of a few days, I determined to test the capabilities of large doses of quinine: ten grains were administered at bedtime, with seeming advantage; on the following day she took fifteen grains, and, on the third day, twenty grains. On this latter day the pruritus had ceased, and she expressed a feeling of complete relief; but every now and then she experienced sharp, deep-seated, or, as she called them, stabbing pains in different parts of the body; and it seemed as though the cutaneous nerves were benumbed, but that the pathogenetic principle was still active in the deeper nerves. At this time she complained of severe pain in the occipital region, extending to the shoulder, and narrated the fact that she had suffered severely from occipital neuralgia of the opposite side of the head two years before. However, three days later erythematous blotches were seen on the skin, and it became evident that the occipital and humeral neuralgia was the precursor of herpes zoster, which occupied that portion of the integument supplied by the ascending and posterior decending branches of the cervical plexus. The ulcerations caused by the herpes were troublesome for several weeks, particularly on the patches situated upon the parietal bone and beneath the jaw; and the pain was wearing, and often intense. Besides the skin, she complained of pain inside the mouth, and of stiffness and pain of the side of the tongue.

We had now acquired a remedy, which I felt would control the pruritus whenever necessity required its use; and on several occasions I had the opportunity of putting it fairly to the test. I directed that ten grains of quinine should be given whenever the existing symptoms threatened a restless and sleepless night; and that it might also be given once additionally, and if necessary twice in the day. One day, when I paid her a visit, I found her very restless; twitching every now and then in her chair, jerking her shoulder or her head, and carrying her hand perpetually to some irritable spot of skin; I requested that she would take ten grains of her remedy instantly; and in a few seconds she was in a state of general repose and calm. It seemed possible to check the irritability of the nervous system in an instant, and that for the future, with ten grains of quinine as a part of her ordinary daily fare, or at hand when required, she might regard her nervous system as completely under her own

control, and her cure as complete. But there was another side to this pleasant picture; there was the possibility of quinine, if used too frequently, losing its influence, and there was the fact that quinine had its inconveniences as well as its attractions. The first large dose, benumbing the auditory nerves, gave rise to deafness, which continued for some time, but, curiously, was not aggravated by successive large doses; then the remedy destroyed appetite, also probably on account of its benumbing effect on the pneumogastric nerves; and subsequently, and most important of all, it occasioned nausea and vomiting. Nevertheless, with all its faults, quinine has become indispensable to this lady, and although generally very much relieved from her neurotic symptoms, she is still obliged to take it from time to time.

I will now pass on to the consideration of another case, which I regard as *prurigo* complicated with ekzema. The patient, aged 33, the wife of a physician, was introduced to me by her husband on the 30th of April, 1869. She was thin and pale, with a carriage which betokened lassitude and prostration, features contracted by exhaustion, and the hyperæmia of gutta rosea covering her nose. She complained of restless and sleepless nights, disturbed by pruritus and the exaltation of pruritus to the extent of nearly producing phrensy. At the hands of her husband and his friends she had run the gauntlet of ordinary remedies, and had pursued the orthodox methods without result. Nevertheless, I fancied that my ferro-arsenical drops might still be efficacious, and I prescribed them accordingly, ordering, locally, ablution of the irritable skin with the juniper-tar soap, and subsequent inunction of the oxide of zinc ointment in combination with the juniper tar. A fortnight later, it became necessary to stop the arsenic, and to prescribe an aperient. I selected that of sulphate of magnesia in infusion of roses, with quinine; and with the view of attacking the neuralgic element of the affection, I prescribed ten grains of quinine to be taken at bedtime every night.

On the 5th of June I was favoured by her husband with the following note, which records a brief history of her previous state, and of the results of the treatment:—"When my wife consulted you a short time ago she had been suffering for nearly a year, to the most intense degree, from itching arising from ekzema of the anus and vulva. She had tried arsenic and various other remedies with occasional temporary relief. Under arsenic she improved, but was obliged, after a short time, to discontinue its use, in consequence of the intestinal irritation it excited. You, upon first seeing her, ordered arsenic in three-drop doses of Fowler's solution. After taking it for three weeks it began to irritate considerably, and the patient was not in the

least better. You then ordered her to take ten grains of quinine in a wine-glass of sherry every night at bedtime. She took it for four successive nights, and then left it off, feeling herself comparatively well. Upon each occasion of taking it, in about ten minutes, she experienced a complete sense of relief, and a *delightful feeling of quiet and prostration*. She took at the same time the aperient mixture twice a day. About a fortnight has now elapsed since taking the last nightly dose of quinine, and she has hardly felt any itching since, and has had no severe attack. With many thanks for what appears to be on the eve of a complete cure, I remain, with very great gratitude," &c.

I may add to the above, that not only did the pruritus cease, but that, having ceased, the ekzema took its departure spontaneously; appearing, as I believe to be the fact, to have been kept up by the neurodynic affection of the skin.—*Journal of Cutaneous Medicine, Jan.* 1870, *p.* 455.

67.—ON THE TREATMENT OF CARBUNCLE.

By Dr. PETER EADE, Physician to the Norfolk and Norwich Hospital.

[Mr. Startin holds the opinion that boils and carbuncles are parasitic in their origin. This opinion is rather borne out by the success attending treatment founded upon the assumption of its truth, than upon actual microscopic observation. Dr. Eade introduces into every possible portion of the mass a strong solution of carbolic acid.]

J. P., aged 74, a remarkably hale, stout, and robust man of his age, free from other bodily disease, although the subject of chronic mania, was attacked about Sept. 24th with carbuncle of the back of the neck. It began, as usual, as a small inflamed and thickened spot, and the central thickening and circumferential redness gradually increased, with about the usual amount of pain and constitutional irritation. On Sept. 28th, four days after the commencement, being then about three inches in diameter, a free crucial incision was made across it, and then poultices of linseed meal were constantly applied; but it continued steadily to enlarge. Five days later, its progress being still quite unchecked, and its diameter having considerably increased, it was again freely divided crucially; and next day —the cut portions of the carbuncle, as well as its numerous small openings, having begun to discharge dirty pus and small strings of sloughy tissue—the poultices were omitted, and it was covered all over with lint saturated with oil containing one part to five of carbolic acid, at the same time that strips of lint soaked in the same were laid in the fossæ formed by the divi-

sion of the diseased mass, and were also freely inserted into all the natural openings which had formed in it, all being renewed at intervals of a few hours. At the end of two days a very remarkable change was observed. All the internal parts of the tumour with which the carbolic acid had come in contact had lost their bluish and dirty-sloughy appearance, and had now a remarkably red and florid look, with fresh granulations rapidly springing up in them; and the tumour had evidently ceased to spread on the right side, which was, in reality, the one where the small openings were most numerous, nearest to which the incisions had been made, and where, consequently, the carbolic oil had been most completely and thoroughly applied. As the left side, however, still continued to extend, and as this spreading appeared to be but little, if at all, checked by the incisions, a deep eschar of two inches' diameter was now (Oct. 6th) made near its outer edge with acid nitrate of mercury, the carbolic oil applied as before, and the whole covered (as advised by Mr. Startin) with a poultice smeared with mercurial ointment. After this the carbuncle, which had now attained a diameter of several inches, and in fact almost covered the entired surface of the back of the neck, ceased to spread; the circumferential redness subsided; the solid centre passed through its stage of boggy softening quickly, and with a small amount of suppuration; only a few very small pieces of core or slough were discharged; and in a few days the soreness and swelling were nearly gone, the patient was eating voraciously, and was in fact well. He was throughout supported as fully as possible by liquid food and a large supply of stimulants, but not much medicine was taken. During the course of the treatment several small festers or incipient boils appeared around the margin of the carbuncle, but they were all completely aborted by the free application of the acid caustic to their apices.

In considering this case, two points appear to me to be worthy of notice.

1. The great age of the patient, and the large size of the tumour; in spite of which recovery took place.

2. The influence of the treatment adopted in producing the favourable result.

On the first point I would only say that, though doubtless many aged patients do survive an attack of carbuncle, even when as extensive as this one, yet that the rule is the other way, and that a carbuncle of any great size in an elderly patient must always be looked upon as a most formidable disease; whilst the danger must be proportionably increased when, as in this case, it covers the whole of a broad *nucha*, or when the patient has attained so advanced an age as seventy-four years.

On the second point, I would express the opinion (shared

both by Mr. Nichols and Mr. Watson, who watched the case with me) that the carbolic acid had a marked effect in checking the spread of the carbuncular growth wherever it was, and could be, applied *beneath* the skin, at the same time that the inflammation and swelling continued to spread rapidly on the side where the acid could not be so applied. But, independently of any such opinion, it is quite certain that its application produced a speedy and marked effect on the appearance of the sloughing tissue. Pale, flabby, and sloughy cellular tissue became quickly covered with new, red, and even florid granulations; the amount of suppuration was much diminished, and throughout a much smaller quantity than usual of shreds of slough were discharged; whilst the diseased skin, when its spread was once arrested, appeared to regain with great rapidity its natural level, colour, and consistency.

The effect of the caustic in checking the increase of the little angry festers which formed below the tumour, where the discharge had run down upon healthy skin, was most immediate and remarkable.—*Lancet, Dec.* 11, 1869, *p.* 800.

68.—PSORIASIS; ITS TREATMENT BY CARBOLIC ACID.

By Dr. JOHN M'NAB, Loch Inver.

In the healthy state, the corion, or outer surface of the cutis vera, is incessantly secreting a semi-fluid viscid substance, which afterwards becomes dry and semi-transparent, and is constantly thrown off in the form of small, thin, amorphous scales, to be replaced by others of the same kind in regular and uninterrupted succession. This secretion is ascertained by the appropriate chemical tests to be of an albuminous nature, and when the secreting surface of corion becomes inflamed, or otherwise disordered, its functions are no longer performed in the same uniform and regular manner, but under special abnormal conditions which constitute the disease in question. Dr. Aitken, one of the most recent and most comprehensive writers on the science and practice of medicine, decribes psoriasis as "characterised by the development of irregularly-formed patches slightly raised above the level of the skin, and covered with thin, dry, white scales. The patches may be distinct, small, and scattered, or larger, confounded together, and irregular; or they may be so extended as to make a continuous surface. Hence the names of the varieties of psoriasis. The intense itchiness and the eruption is always preceded by that form of dyspepsia or impaired digestion in which there is a superabundance of acidity, much formation of lithates, and an obvious constitutional tendency to gout."

In this description we readily acquiesce, and further regard the disease essentially as the local manifestation of a special depraved condition of the system, induced by derangement of the organic functions, and as such requiring for its cure special local and general therapeutic agents. Every morbid state of the secreting surface of the corion gives rise to corresponding morbid secretions, thus constituting an unnatural condition of the cuticle or scarf-skin; and, conversely, every diseased or abnormal state of the cuticle results from, and originally depends upon, an abnormal state of the cuticular or secreting surface of the cutis vera. In psoriasis, as a general rule, this morbid condition consists of a generic inflammation, more or less circumscribed according to the species of the disease presented, and the inflammation, by whatever means induced, may be regarded as the primary cause of this morbid and altered secretion; and although the secretion remains essentially the same after the inflammatory action has abated, it—now in the form of scaly incrustations—is nevertheless due to it. The secreting surface of the corion has now assumed a pathological function instead of a physiological one, and continues to exercise this function until corrected by external and other appropriate remedies; and it is in correcting and restoring this perverted function that the indications of cure really lie. It is essential, however, that attention be directed to the disease as recognised by its local manifestations. The inflammatory process, with which it is always ushered in, so alters the part affected as to require certain local applications to restore it to its original functional activity; and it is in this respect that we find carbolic acid acts such an important part in the treatment.

Shortly after the publication of Professor Lister's observations and experiments on the antiseptic method of treating wounds, it occurred to me that carbolic acid, applied in the form of ointment to the parts affected with psoriasis, might be of service in curing the disease; and a consideration of the close resemblance subsisting between itself and other carbo-hydrogen compounds of recognised value in the treatment of the disease rendered the idea highly probable; and, having a number of old-standing cases under my care at the time, I resolved to give the remedy a fair trial. Accordingly, I began by applying it in a case of inveterate psoriasis that had hitherto baffled all attempts at a permanent cure by the ordinary means, and found that, after continuing the treatment for some time, the scales began to fall off, the process of desquamation was retarded, and the skin began to assume a healthier aspect. At this stage of the process the carbolic acid application was discontinued, and the oxide-of-zinc ointment substituted for a short time, when a complete cure was subsequently effected. I have had under my care a number of

obstinate cases of psoriasis since, and have been successful in treating them all by carbolic acid, combined with the internal administration of liquor arsenicalis and the other necessary means for obviating the general predisposition to the disease.

The curative properties of carbolic acid being once established by practical experience, it becomes a subject of interest and scientific importance to determine its method of cure, or its *modus operandi*. This consists chiefly in acting chemically on the organic compounds of the parts affected. It coagulates the albuminous secretion of which the disease essentially consists, and renders the diseased part more compressed, and less liable to the process of exudation peculiar to this morbid state. It neutralises the effects of the oxygen of the atmospheric air on the affected part by entering into chemical combination with it, and thus obviates any local action the oxygen of the air might induce. This is apparent from the remarkably high percentage of carbon it contains, for, according to Laurent, the formula of carbolic acid is $(C_{12} H_5) O, HO$, or the hydrated oxide of phenyle; and we cannot doubt that other bodies belonging to the same series possess similar therapeutic properties. We do not claim for carbolic acid, or any of its congeners, any special or specific curative influence independent and apart from constitutional treatment; for, in the light of our pathology, it is apparent that constitutional symptoms must be met by the appropriate constitutional remedies. But in a large number of cases the disease depends upon constitutional causes that have been remedied, that are no longer in operation, that have now become passive, but have left behind a depraved state of the skin sufficient to perpetuate the disease indefinitely, irrespective of all constitutional causes.

In such cases the local application of carbolic acid ointment will be productive of the greatest benefit. The ointment ought to consist of *one* part by weight of the acid to *four* of common lard, melted down and mixed, and afterwards allowed to cool. It ought to be applied every night at bed-time with gutta-percha tissue covering, to prevent evaporation, and this should be continued until the scales disappear, and the skin begins to assume a smoother and healthier aspect. The oxide-of-zinc ointment is now to be substituted, and continued until a complete cure takes place. The utility of applying the oxide of zinc afterwards depends solely on its astringent effects, and keeping the parts moist, and excluding the atmospheric air. The organic functions must, as we have observed, be duly regulated, and the effete products eliminated through the emunctories; but the specific local inflammation, which is the generic character of the disease, is more amenable to the direct curative influence of carbolic acid than to any other therapeutic agent

with which we are acquainted, and will be found to form a valuable addition to the materia medica of the dermatologist.—*Lancet, March* 19, 1870, *p.* 408.

69.—PATHOLOGY OF ALOPECIA AREATA.

Professor RINDFLEISCH of Bonn contributes a paper on this subject to the *Archiv für Dermatologie und Syphilis*. He starts with the assumption that the Microsporon Audouini has been proved by Pincus and others to be a myth, and that the parasitic nature of the disease has been inferred from the analogies which its development and clinical characters present to those of truly parasitic dermatoses. He proceeds to show that its characteristic features may be accounted for in a different way. It has long been noted that the margins of the affected patch in alopecia areata are devoid of those broken hairs which are conspicuous in tinea tonsurans; also, that there is a general thinning of the hair over the whole scalp. The former peculiarity is accounted for by the solution of continuity in the case of each individual hair taking place at the junction of the lower and middle thirds of its intrafollicular portion. The latter suggests that the operation of the morbific cause is not confined to the bald patches. A temporary malnutrition of the root of the hairs suffice to explain everything. Each hair, in emerging from its follicle, has to overcome a certain amount of resistance offered by the superficial layers of its sheath. Under normal conditions, the continuous cell-proliferation at the root supplies the needful *vis à tergo*. If this, however, undergo a temporary check, the hair ceases to advance, and the opposed surfaces of hair and sheath become adherent, Just below this point is the atrophied tract of the hair. When any such hair is pulled, therefore, it breaks at the bottom of its follicle, and carries with it a considerable part of its sheath. The causes of the malnutrition are to be sought in some influence brought to bear upon the trophic nerves. Sudden cooling of a perspiring scalp has been known to precede alopecia areata. Treatment based on these considerations has proved successful. A lotion consisting of equal parts of tincture of capsicum and glycerine is applied to the affected area: the former ingredient, with a view to stimulate nutrition and promote the growth of new hairs; the latter, to soften the adhesion between the hair and its sheath, and so to facilitate its extrusion.—*British Medical Journal, March* 19, 1870, *p.* 290.

70.—GLYCERATE OF TAR IN SKIN DISEASES.

The excellent effects of tar in skin diseases leads us to call attention to the elegant preparation called glycerate of tar.

Its preparation is thus described by Mr. J. B. Moore, in the *American Journal of Pharmacy*:—

Glycerine seems to be a good solvent of the medicinal properties of tar, and possessing demulcent, alterative, and nutrient properties, serves as a valuable adjunct to the latter therapeutically.

I will now present the formula which I have adopted, after repeated trials, as the most desirable for the manufacture of this preparation:—

℞. Picis liquidæ (strained), ℥j. troy; magnesiæ carb. (rubbed to powder on a sieve), ℥iij.; alcoholis, ℥ij.; glycerin, ℥iv.; aquæ, quantum sufficit.

Mix the alcohol and glycerine with ten fluid ounces of water. Rub the tar in a mortar, first with the carb. magnesia gradually added, until a smooth pulverulent mixture is obtained; then gradually add, in small portions at a time, with thorough trituration continued for fifteen or twenty minutes, six fluid ounces of the mixture of alcohol, glycerine, and water, and strain, with strong expression; return the residue to the mortar, and repeat the trituration as before, with five fluid ounces more of the same liquid, and express; again treat the dregs in the same manner with the remainder of the menstruum, and after expression reduce the residue by trituration to a uniform condition, and finally pack firmly in a glass funnel prepared for percolation, and pour upon it the expressed liquors, previously mixed, and when the mixture has all passed from the surface continue the percolation with water until one pint of the liquid has been obtained.

When first prepared, the "glycerate" is of a beautiful rich reddish-brown colour. After a short time it loses, in a measure, its transparency, in consequence of a separation of *inert* pitchy matter. But its pristine beauty may be easily restored by filtration, which is accomplished in a few minutes, as it passes the filter very rapidly. This deposit of resinous matter continues for a considerable lapse of time, but does not diminish or impair in the slightest degree the medicinal virtues of the preparation, but simply temporarily mars its beauty.

It possesses in a high degree all the sensible properties of tar. In this they are more strongly marked than in any preparation of tar, excepting the tincture, I have seen.

In conjunction with the fluid extract of wild-cherry bark, acetate, or syr. squills, syrups of guinaria, lactunas carium, &c., in varied proportions to suit the views of the prescriber, it will form elegant and palatable combinations, which will be peculiarly adapted to the treatment of chronic coughs, and the various diseases of the pulmonary organs.

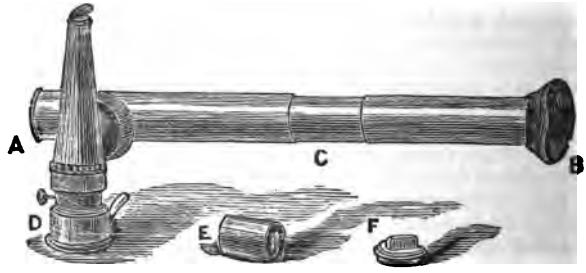
Each fluid ounce of the glycerate, if the process has been carefully managed, will represent about thirty grains of tar, the dose of which is from a dessert to a tablespoonful.

The glycerate may be made, and I think almost equally well, without alcohol, by replacing that liquid with glycerine. When made in this way, the preparation deposits less resinous matter, as glycerine takes up less of that substance, yet the odour and taste of the tar is nearly as strong as when alcohol is employed in its manufacture.—*Medical Press and Circular*, *Dec.* 29, 1869, *p.* 526.

AFFECTIONS OF THE EYE.

71.—DR. BEALE'S SELF-ILLUMINATING OPHTHALMOSCOPE.

The structure of this instrument, which has been devised by Dr. Lionel Beale, F.R.S., Physician to King's College Hospital, can be explained in few words by aid of the accompanying figure. A is a simple brass telescope tube, about an inch in diameter, to the side of which the little lamp D is fixed; C is another tube upon which slides the first tube A, and which also carries a tube with a piece of wood fitted to the end, which is shaped to the margin of the orbit B; the inner tube C contains the reflector and the ophthalmoscope lens; D is the paraffin lamp, and is similar to the lamp used in Dr. Beale's demonstrating microscopes; E is a second ophthalmoscope lens of higher



magnifying power; F is the plug which is screwed into the lamp, D, when it is removed from the instrument and placed in the case for packing.

The ophthalmoscope can be held in the hand, or it may be mounted upon a stem or tripod stand. It can be used in any

room in *full day-light* or *when lamps are lighted. This arrangement entirely obviates the necessity of the dark room for ophthalmoscopic observations.* The eyes may be examined when the patient is in the recumbent posture as well as when sitting or standing, and in many cases without using atropine. When an observation is to be made, the observer should request the patient to direct the other eye so that he may see distinctly some object on a wall from eight to ten feet distant, as a spot in the pattern of the paper, or a red wafer or piece of sealing-wax placed there for the purpose, about one foot higher than the level of the eye of the patient. The patient should be told to look, now a little above or below, to the right or to the left of this mark, until the optic disc, with the vessels, comes well into view; in many instances this will be immediately. The reason for preferring a distant object to a near one (as a ball attached to the end of a bar connected with the ophthalmoscope itself) is, that the pupil dilates, while it will contract if a near object be selected; and, by reason of its smallness, a good view of the disc cannot be obtained without the previous use of atropine.

Focussing.—The end tube (which carries the wooden shield B to be applied to the orbit of the patient) may be moved backwards and forwards until the right focus for the retina has been found. If a mark be made on the tube, the rough focus can be quickly obtained on all subsequent occasions, and the exact adjustment then made for the individual eye under examination, by screwing the tube about the eighth or the quarter of an inch from, or towards, the observer. In order that the distance between the magnifying lens and the reflector may be altered, a considerable length of inner tube, C, has been provided, and the image formed may be increased or diminished at pleasure.

Ophthalmoscope lenses, E, of different magnifying powers, can be supplied; each being fixed in a tube, which slides readily into the place made for its reception. Each lens is so mounted that it may be turned upon an axis, in order that the reflexions of the reflector upon its anterior and posterior surfaces, which would much interfere with the distinctness of the image of the retina, may be readily thrown out of the field of vision. This object is effected if the lens be thrown less than a quarter of an inch out of the plane.

Spectacle lenses can be fitted to the eye-piece if required.

Of the lamp.—In order to light the lamp, it has but to be removed from the axis on which it revolves. The wick is then turned up a little, lighted, and immediately lowered, when the lamp is returned to its plane, and the wick adjusted so as to give the brightest light possible without smoke. Only the best

paraffin should be used for these lamps, and if it be nearly saturated with camphor its illuminating property will be much improved. The intensity of the illumination will be further increased if a white surface of porcelain be placed behind the light. The same object is fulfilled by covering a portion of the inner surface of the metal chimney with a thin coating of plaster of Paris or whiting. The plane surface of the bull's-eye condenser towards the lamp requires to be carefully wiped occasionally, as the vapour from the paraffin lamp condenses upon it. Before the instrument is replaced in its case, the paraffin reservoir is to be unscrewed, and its brass stopper well screwed down. In this way the escape of paraffin is effectually provided against.

The ophthalmoscope may be inclined at any angle if the lamp be rotated on its moveable axis a little, for it must be kept perpendicular in all positions of the instrument.

The observer may employ either his right or left eye as he desires, the position of the lamp being altered by turning it round.

These ophthalmoscopes are made by Mr. T. Hawksley, 4, Blenheim Street, Bond Street, London. The instrument, with lamp, reservoir, and two lenses of 2½ and 3 inches focus respectively, arranged in a mahogany case complete, costs two guineas. Extra lenses and other apparatus for the ear, bladder, throat, etc., can be supplied if required. Each instrument is tried and carefully examined by Mr. Hawksley before being sold.—*British Medical Journal, April* 2, 1870, *p.* 336.

72.—FLEXIBLE LACHRYMAL PROBES.

Dr. WILLIAMS, of Boston, (Trans. of the Amer. Ophth. Soc., 1869), exhibited to the society a set of flexible probes for the lachrymal passages. He thinks that Bowman's probes, if not bent so as precisely to correspond with the direction of the duct in the individual operated upon, often lacerate the mucous lining of the passages, causing pain and hemorrhage, and retarding the cure by causing local inflammation. He has found in practice that his flexible probes adapt themselves to the sinuosities of the passages, can be introduced with more facility and less pain, and are less likely to take a wrong direction. They have bulbous extremities, of the sizes of Bowman's series, but are slender for one third of the distance from the bulb to the flat disc in the middle. They are of alloyed silver, and have an elastic flexibility without being liable to bend upon themselves in encountering obstructions, as would be the case if the silver were pure.—*Ophthalmic Hospital Reports, Nov.* 1869, *p.* 310.

73.—LEADEN STYLES FOR LACHRYMAL PASSAGES.

Dr. JOHN GREEN, of St. Louis has contributed to the Trans. of the Amer. Ophth. Soc., 1869, a paper on the use of leaden styles in the treatment of disease of the lachrymal sac. He says: "Metallic styles, worn for a longer or shorter time in the lachrymal sac and nasal duct, have long been used in the treatment of obstructions of those passages. Of modern surgeons, Dr. E. Williams of Cincinnati, has employed this method with the greatest success. He uses styles of about eight sizes, ranging from ·035 to ·12 inch, or from the size of No. 3 of Mr. Bowman's series to a diameter of about double that of No. 6. The styles are of silver, and are introduced through an opening into the lachrymal sac made by slitting up the upper canaliculus with a fine pair of scissors. He begins with a style as large as can easily be inserted, changing to larger sizes as fast as the state of the parts will permit. During the whole course of the treatment the style is frequently removed, and the sac and duct treated by astringent injections. The results are extremely satisfactory, both as regards the time required and the ease and certainty with which the case is conducted to a successful issue, and the method is especially adapted for the worst forms of obstruction, such as traumatic or complicated cases. Experience has shewn, however, that it is necessary to use styles of large diameter, in order to guard against relapse. This seems to arise in part from the silver styles being too rigid to accommodate themselves to the direction of the duct, so that they exert unequal pressure on its bony walls. The style, instead of lying loosely in the middle of the canal, is, in fact, making constant pressure upon a few points, so that it tends to produce ulceration of the lining membrane, and partial absorption and ultimate change of form of the bony walls. The canal must, in short, be brought into the form of a strictly cylindrical tube before the style can begin to distend it uniformly, and to exert that equable pressure upon the mucous membrane that is essential to its beneficial action. Reflecting upon the mode in which the curative effect of the styles was attained, the writer was led to the conclusion that the period of treatment might be materially abridged, with increased comfort to the patient, by the substitution of flexible styles of lead for the rigid ones of silver. The experiment was tried upon a very unpromising traumatic case, complicated with abscess of the sac, and with a result so gratifying as to lead to other trials which have all proved highly satisfactory. The apparent advantages of the method are briefly these:—

1. The leaden styles with the maximum degree of comfort, and with the minimum degree of risk from unequal pressure.

2. Under their use the discharge from the sac soon becomes mucous and rapidly disappears, without medication of the sac by syringing or otherwise.

3. A less degree of dilatation, by the use of a smaller size of style, answers for the completion of the cure, thus enabling us materially to abridge the period of treatment.

4. The toleration of the style and the favourable progress of the cure, without further treatment, enable us, in certain cases, to dispense with the assiduous attention which is so essential with other methods. The plan works particularly well, therefore, in cases, where patients are irregular in attendance, and where, for any reason, but a short time can be spared for treatment.

The styles used have been made from the purest and softest lead drawn into wire, of sizes ranging from one to two millimetres ($\frac{1}{14}$th to $\frac{1}{13}$th of an inch) in diameter. These sizes correspond in the lower numbers to Nos. 4 to 6 of Mr. Bowman's probes. In the larger sizes the maximum (No. 6) of Mr. Bowman in the ratio of 2 to 1·3. They are smaller than the maximum sizes used by Dr. Williams, in the ratio of 2 to 2·9; and they are probably smaller also than the largest styles which he commonly employs. Larger sizes, ranging from two to three millimetres in diameter, have not as yet seemed to be needed.

To make the styles from the leaden wire, it is cut into lengths of two inches for the upper canaliculus; if intended to be passed by the way of the lower canaliculus, they should be about a quarter of an inch shorter. One end of the style is carefully rounded with a penknife, and smoothed by scraping. They are made perfectly straight, as they are more easily introduced in this form: the upper end is bent over into a hooked form by means of forceps, after the style is placed in position. The smaller sizes are introduced with great difficulty, unless a way has been prepared for them by wearing a rigid style of silver for a few hours, or perhaps for a day or two. After this there is no further trouble in exchanging the old style for the next larger, provided only that we take care to introduce the new one immediately upon the withdrawal of the old. The largest sizes (of from two to three millimetres in diameter) if used, will be found rather heavy, they should therefore be drawn in the form of tubes, instead of solid wire. The smaller sizes might also perhaps be made tubular, and their introduction facilitated by passing a fine steel wire into the cavity. Where elegance is an object, the styles may be easily silvered or gilt.—*Ophthalmic Hospital Reports, Nov.* 1869, *p.* 310.

74.—ON AN IMPROVED METHOD OF EXTRACTING IN CASES OF CATARACT.

By Dr. CHARLES BELL TAYLOR, Surgeon to the Nottingham and Midland Eye Infirmary.

[Dr. Taylor has on several previous occasions published cases of cataract illustrating the mode of operating followed by him. The following article gives a resumé of the whole, and fully describes the operation.]

The instruments that I employ are a pair of sharp forceps that pierce the sclerotic, a very light speculum (a modification of Von Graefe's), and two knives, a line in width and bent at an angle similar to the ordinary iridectomy knives, one with a sharp point, and the other with a blunt or bulbous extremity.

As the danger, even if vomiting occurs, is very slight with the form of incision I am about to describe, I usually prefer to have the patient narcotised, and, as a rule, push the chloroform to full anæsthesia. The lids should then be kept apart by the speculum, and the globe gently depressed with a pair of ordinary forceps in the operator's right hand. Having got the eye into a favourable position, it should be fixed by the sharp forceps at about the junction of the upper with the middle third of the cornea. The pointed knife is then entered in the cornea-sclerotic junction, one or two lines from the forceps, at the summit of the cornea, pushed well into the anterior chamber, and, with a gentle sawing motion, the eye being steadied with the left hand, carried along the summit, a distance of three lines. The aqueous will now escape, and if we wish to extract without iridectomy, or if the condition of the globe before and after incision, as regards tension, is such that we have reason to fear excessive bleeding from excision of a portion of iris, it will be well at this stage to open the capsule carefully in its central and lower segments, a proceeding very much facilitated by the small size of the wound, the safety with which the globe may be manipulated, and a previously dilated pupil. If the cornea remains firm, if the lens is readily loosened on incision of the capsule, if the patient is perfectly quiescent, shows no tendency to vomit, and other circumstances prove favourable, we may extract without iridectomy, in which case it will be simply necessary to enlarge the wound in the manner hereafter to be described.

If, from the nature of the case, we have decided on associating an iridectomy with the extraction, and desire to derive the advantages of an iridectomy, so far as tension is concerned, the iris forceps should now be introduced into the wound, the blades opened, and the iris seized near to its pupillary border, drawn out, and divided at the right hand angle of the incision, carried over and excised at the left as in iridectomy for glaucoma. If,

however, tension is quite normal, and the removal of a portion of iris is not likely to have a favourable influence on the after-progress of the case, a very small incision, or the merest slit in the constrictor fibres of the iris, will suffice to reduce the risk from bruising to a minimum, and still to some extent preserve the advantages of a natural pupil. If we have not found it necessary to open the capsule prior to iridectomy, it should now be rendered tense and carefully incised with the ordinary cystotome, the stem of which it is as well to have made either of platinum or soft steel, so that it may be bent in accordance with the projection of the patient's brow, or relative position of the eyeball. Having opened the capsule, and slightly loosened the lens, the eye should be seized to the right of the globe with a pair of ordinary forceps, and the wound enlarged to the left with the blunt-pointed knife (encroaching slightly upon the sclerotic) to an extent that experience tells us will, with a similar wound to the right, suffice for the ready exit of the lens; fixing the eye then with the left hand, the process must be repeated to the right. The incision is thus localised in a definite line, and its extent at any period of the operation is only limited by the will of the operator.

If the iris has been left intact, a comparatively large flap will be required, but if iridectomy has either preceded or is associated with the extraction, a very small shallow flap will suffice, one which yields readily to the advancing lens, while it is sufficiently slit-like and elastic to close without artificial apposition or external support, strong enough to resist protrusion by advancing vitreous, and too resilient to permit of accidental reflection.

The lens may now be extruded by slight pressure upon the globe, without passing any instrument into the eye, cortical fragments removed with ease, and any portion of capsule or lens matter likely to obstruct vision, be either torn across or removed with the sharp hook, canula forceps, or sucker.

If, from the existence of firm adhesions, the lens cannot be started by pressure, it should be dipped out with the wire-loop spoon, an instrument which from its extreme tenuity assists the exit of the cataract without adding to its bulk.

If it is desirable to extract by the lower section, the same form of incision may be employed, and this is preferable in a few cases where the lens is superficially softened, as any pulpy cortical matter left behind in the eye will gravitate to the bottom of the anterior chamber, pass harmlessly through the coloboma iridis, and either undergo absorption, or be washed out with the aqueous. The risk of its lodging behind the lower segment of iris and setting up subsequent irritation is thus avoided, but the section is less sheltered, and the coloboma uglier and more disturbing to vision.

The operation completed, I apply a drop of solution of atropine in the corner of the eye, and cover the lids with a pad of fine cotton wool, dipped in, but not saturated with cold water. If sodden, the pad is heavy, irregular, unmangeable; but just moistened on the surface, it fits accurately into the orbital cavity, and speedily dries into a smooth film, closely bedded to the surface of the lids, absorbing moisture, insuring equable support, a regular temperature, and the exclusion of light. It must be secured *in situ*, with gentle pressure, by thin strips of soap plaister, spread on unglazed calico (which adheres without warming). I find this by far the best dressing. Pressure can be accurately applied by strips fixed to the forehead and cheek, and, if necessary, by an additional broad strap passed from temple to temple. Any kind of compress bandage may also, if required, be readily applied over the pads and plaister. Inflammatory or other complications coming on after the operation must be treated on general principles, such, however, very seldom occur; rest on the couch for forty-eight hours in a partially darkened room, and confinement for a week, being, as a rule, all the after-treatment required.

In adopting this operation, the operator may use the right hand for either eye, so that there is no necessity for ambi-dexterity, and no risk of that increased fatality, which, from the greater difficulties of execution, has hitherto attended operations on the left eye. Up to the last moment, or indeed until success is almost certain, we are not committed to any special form of operation; it is in our power, in the interest of the patient, and with perfect safety, to delay, abandon, or modify the operation, as the exigencies of the moment may demand, or unforeseen circumstances require. With an incision three lines only in extent, we are in a position to handle the globe with impunity, while, should any accident occur, such as rupture of the hyaloid, prolapse of vitreous, recession of the cataract, hemorrhage into the anterior chamber, vomiting or other alarming symptom from chloroform, we may meet these complications with the utmost calmness and deliberation, knowing that the safety of the patient is secured. The protruding vitreous may be clipped off, a suture may be applied, blood sucked out of the chamber, the wound slightly enlarged, or the lens dipped out with the wire spoon; or what is sometimes better, we may safely delay the extraction by making the iridectomy a preliminary rather than a part of the operation; and, utilising the experience we have gained of the patient's peculiarities, the state of the eyeball and condition of the lens to the benefit of both patient and operator when extracting some six weeks later. Should, on the contrary, all go well, we may aim at the maximum of success, and enlarge the wound sufficiently to permit the exit of the lens

without an iridectomy, and this, the wound being localised with such extreme precision, and well back in the corneo-sclerotic junction, may be accomplished with an incision decidedly smaller than the one required in the old flap operation. It is easy to see whether the section is large enough, if the lens is previously loosened, and we may thus in some cases attain, either with or without the aid of the wire spoon, that highest indication of success,—a central and moveable pupil. Short of this also, we may make the iridectomy a mere slit or simple division of the constrictor fibres of the pupil, leaving the ciliary margin untouched, sufficient to permit of the exit of the lens with a minimum amount of bruising, and thus preserve, though to a less degree, the advantages of a natural pupil. If, in the extraction, without iridectomy, the iris should prolapse, the comparatively small size of the wound, and the greater firmness of the flap will permit of our safely replacing it, as well as of coaxing out any cortical débris that may have floated into the pupillary space. It will thus be seen that the greater portion of the operation is completed with a wound so small, that the occurrence of any accident, so far from finding the operator, as in the old flap method, utterly powerless, need not cause either danger, embarrassment, or delay. By performing the iridectomy and laceration of the capsule through a wound only three lines in extent, we preserve the effect of atropine upon the pupil, if not fully, at least to a great extent, and facility of manipulation with an enlarged pupil renders laceration of the capsule a matter of great ease and certainty, and not a mere flourish, to which the difficulties and danger attending the flap method have frequently reduced this portion of the operation.

In the old method, when the aqueous is gone, the cornea wrinkled, and the eyeball collapsed, it is difficult, especially in some lights, such as we are often obliged to put up with in operating, to see the exact position of parts. The complete evacuation of the aqueous occasioned by the large size of the wound, and the irritation of the iris causes the pupil to contract, it would not be safe to render the capsule tense, and its efficient laceration, which would afford so much facility for the subsequent removal of the lens, becomes a matter of difficulty and danger when the tissues are collapsed, and offer no resistance to the pricker. With a three-line incision, on the contrary, such as I have described, the relative position of parts is much better preserved. The aqueous is not so completely evacuated, irritation of the iris is not so great as to cause more than partial contraction of the previously dilated pupil. Wrinkling of the cornea does not obscure the operator's vision, and the capsule is consequently safely, and much more easily rendered tense, and incised to the requisite extent.

Of course the greatest advantage is the greater certainty of success, and (especially in old people) the slight after-treatment required. It is necessary in infirmary practice to operate upon so many worn-out marasmic individuals, that a fortunate issue in a majority of such patients must plead strongly in favour of any method that has been successfully adopted in like cases.—*Ophthalmic Hospital Reports, April* 1869, *p.* 197.

75.—ON SENILE CATARACT.

By J. Soelberg Wells, Esq., Professor of Ophthalmology in King's College, Ophthalmic Surgeon to King's College Hospital, &c.

[In the following article Mr. Wells draws attention to a few points of practical importance with regard to the subject of cataract, to which he believes sufficient importance is not always attached.]

The patient (J. C., aged 59) is a woman in good health, who is suffering from cataract in both eyes, but in different degree, for in the right eye it is ripe or mature, whereas in the left it is still immature. A glance at the two eyes at once reveals the difference. In the right eye, the pupil is occupied by a yellowish-white opacity, which reaches close up to the margin of the pupil; whereas in the left eye, a superficial observer might easily altogether overlook the presence of cataract, for, as the anterior portions of the lens are still transparent, the opacity is only of a greyish tint, a few grey spiculæ traversing the pupillary area. But with the oblique illumination* the existence of a cataract becomes very evident, the opacity being especially marked at the posterior part of the lens and at the periphery. With this eye she is still able to decipher words of large print (No. 16 of Jaeger's test-types), but with the right she can only see the movements of a hand.

Now, what is meant by the term "ripeness of a cataract"? and why is it of importance with regard to an operation? A cataract is called ripe when the whole lens is opaque, so that the opacity reaches quite up to the pupil, and the edge of the latter does not throw a shadow on the anterior portion of the lens. Moreover, in such a case the sight is so much impaired that the patient is only able to see the movements of the hand, or of some large object, but is not able to count fingers. If

* This mode of examination is thus conducted:—A lamp being placed somewhat in front and to one side of the patient, at a distance of from two to two and a half feet, and on a level with his eye, the light is concentrated on the cornea or crystalline lens by a strong convex lens of two or three inches focus.

he is still able to do the latter at the distance of a foot or two, or is able to decipher letters of large print, we know at once that some portions of the cortical substance are still transparent. A ripe senile cataract affords the best prognosis of the result of an operation, for the lens will then probably come out *en masse;* whereas if a considerable portion of the surface matter is still transparent and soft, it separates from the hard central part, and remains behind the iris or in the pupil, and, swelling up, may give rise to a good deal of irritation and even inflammation, or to a dense secondary cataract. Let us now briefly consider the following questions with regard to our patient:—1. Are both eyes to be operated upon? 2. Is the condition of the eyes favourable? 3. What operation is to be performed?

1. Although she has still sufficient sight in the left eye to with difficulty find her way about in a place which she knows, she cannot guide herself in the street, nor employ herself in any household duties. Yet, as the cataract is still immature in this eye, it is advisable only to operate at present on the right eye. As a rule, if only one eye is blind with senile cataract, we generally defer an operation while the sight of the other eye is still good. But in younger persons the personal appearance may come into play, and in children the sensibility of the retina of the cataractous eye is very apt to become greatly impaired from prolonged disuse. But even if the cataract is mature in both eyes, I do not think it safe to operate upon both at the same time, because unsuspected peculiarities in the constitution or temperament may manifest themselves during the after-treatment, a prior knowledge of which may prove of great value in the operation on the second eye, and lead us perhaps to select some other mode of operation for this. But individual circumstances must guide us in deciding on this point.

2. Does the condition of the right eye afford a good prognosis as to the result of the operation? Apparently we may at once answer this question in the affirmative, for the external appearance of the eye is quite healthy, the pupil is active, and the patient can see the shadow of a hand moving in front of this eye. But this is not sufficient, and before deciding upon the prognosis we must also examine the degree of tension of the eyeball, the amount of perception of light, and the state of the field of vision. Inattention to the last two points sometimes leads to the unfortunate and reprehensible error of submitting to an operation a perfectly amaurotic eye affected with cataract. The operation apparently succeeds, the cataract is removed, the pupil is clear; but the patient remains blind, and then it is found, on ophthalmoscopic examination, that there is some dis-

ease of the optic nerve or retina. A patient affected with a mature cataract, the eye being otherwise healthy, should be able to distinguish, in a dark room, the light of a low-burning lamp at a distance of twelve or fifteen feet. The condition of the field of vision is best ascertained in the following manner:—The patient, having been placed in a dark room, is directed to close with his hand the eye which is not under examination, and to look steadily with the other in the direction of his uplifted hand, which should be held straight before him, on a level with his eye, and at a distance of about twelve inches. A lighted candle is then to be held in different parts of the visual field, and the furthest point at which it is still visible in certain directions noted, the candle being alternately shaded and uncovered by our hand, so as to test the readiness and accuracy of the patient's answers. Care should also be taken to shade the candle when it is removed to another part of the field. In our case, the tension of the right eye is quite normal, its field of vision perfect, and the perception of light very good, for she is able to see the light from a low-burning lamp at a distance of fourteen feet. Were it otherwise, and did the perception of light or the field of vision show any marked deterioration, our suspicions of some deep-seated complication of the cataract should be aroused, and the previous history of the case, and the exact mode of the loss of sight, be carefully inquired into. The nature and situation of the contraction or loss of the visual field often affords us a valuable clue to the character of the complication. Thus, if the upper or lower half is lost, we must suspect detachment of the retina; if the lateral halves are wanting (hemiopia), some affection involving the optic nerves. In cases of cerebral amaurosis the contraction of the field is generally concentric, or it commences at the temporal side; whereas in glaucoma it mostly begins at the nasal side, the outer portion of the retina being the first to suffer. Should such a contraction of the field exist, we must very carefully examine the degree of eye-tension, and search for other symptoms of glaucoma.

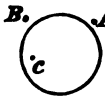
3. Now, what operation should we perform? In senile cataract, as you are aware, the lens must be extracted; for reclination or couching is quite out of the question, and is an operation which should be entirely abandoned. Division by the needle is only applicable in soft cataracts; for in hard, senile cataracts it would have to be repeated over and over again, and many months, or even some years, might elapse before the cataract was absorbed. We must therefore select some mode of extraction, and I should advise, for reasons I need not explain here, the performance of Von Graefe's operation, of which I will give a brief description; for although it is now generally employed, some of you may not be quite conversant with all its

details. The operation is divided into four periods:—1, the incision; 2, the iridectomy; 3, the laceration of the capsule; 4, the removal of the lens. It is to be performed in the following manner:—

1. *The Incision.*—The patient having been placed completely under the influence of chloroform, the eyelids are to be kept apart with the stop speculum, and the eye fixed with a pair of forceps; the point of a long narrow knife (Fig. 1), with its cutting edge turned upwards, is then to be entered in the sclerotic (at the point A, Fig. 2, which represents the left cornea), near the upper and outer portion of the cornea, about one-third of a line from its edge, so that it may enter the anterior chamber quite at the periphery. The point of the knife should be at first directed downwards and inwards, towards c, the edge of the blade being turned a little forwards; and then, when the blade has advanced about three and a half lines into the chamber, the handle is to be depressed, and the point carried along to B, where the counter-puncture is to be made, at a point exactly corresponding to the puncture A. As soon as the counter-puncture has been made, the edge of the blade is to be turned somewhat obliquely upwards and forwards, and the knife pushed straight on until its length is nearly exhausted, when the section is to be completed by drawing it backwards from heel to point. The knife will then lie under the conjunctiva, which is next to be divided, in such a manner as to leave a conjunctival flap of about one to one and a half lines in height.

FIG. 1.

FIG. 2.



2. *The iridectomy.*—The little conjunctival flap should be turned back over the cornea with a very small pair of iris forceps, which will lay bare the prolapsed portion of iris; the latter should, if necessary, be drawn out a little further, and excised to the required extent, quite close to the ciliary insertion. This is not, however, to be done by one cut, but by three or four successsive snips with the scissors, the blades of which are to be slightly turned, so as to follow the curvature of the eyeball. Great care should be taken to snip off the iris quite close to the section, especially at the angles of the latter, where little protrusions of iris are apt to occur.

3. *Laceration of the capsule.*—The operator, steadily fixing the eyeball with the forceps, next proceeds to lacerate the capsule freely with the pricker by successive incisions. The one is to commence at the lower edge of the pupil, or even a little behind it beneath the iris, and extend upwards along its inner side; the other passing to the same extent along the outer margin of the pupil. Both incisions should reach quite up to the periphery of the lens exposed by the iridectomy. Finally, the capsule should be lacerated at its periphery in a line corresponding to the section. In using the pricker, its edge should always be turned in a slanting direction, and not be pressed firmly backwards, otherwise the cataract may be dislocated into the vitreous humour, or its upper margin displaced behind the upper edge of the incision.

4. *Removal of the lens.*—The eye being fixed by the forceps, which are to be applied a little below and on one side of the centre of the lower margin of the cornea, the back of the silver curette (or Von Graefe's vulcanite curette) is to be placed upon the lower margin of the cornea and pressed slightly backwards and upwards, so as to cause the upper edge of the lens to present itself in the section; and then the pressure is to be made directly backwards, in order that the lens may be rotated rouud its transverse axis, and tilted well forwards into the wound. When this has occurred, its exit is to be gently aided by pushing the curette slowly upwards over the surface of the cornea, so that it follows step by step the delivery of the lens. If it is found that portions of the lower cortical substance are stripped off and are inclined to lag behind, the curette should be drawn back again a little, and the fragments of the cortex pushed along after the body of the lens, and in this way the whole of the cataract will generally be removed. If the appearance of the cataract indicates the presence of a good deal of soft matter, it is well to work this gently towards the centre by pressing the curette lightly from the lower and lateral margins of the cornea towards its centre, before attempting to remove the lens, for thus we may generally succeed in getting the soft matter to exude with the firmer nuclean portions. If small fragments of lens-matter still linger behind after the body of the cataract has been removed, they should be coaxed out by again passing the curette over the cornea, and pushing them on in front of the instrument; or, as Von Graefe advises, the lid-holder having been removed, the operator should gently rub the lids, more especially the lower one, in a circular direction, and thus loosen the marginal portions of cortex from behind the iris, and bring them into the area of the pupil, and thence out through the wound.—*Lancet, Dec.* 11, 1869, *p.* 797.

76.—ON EXTRACTION OF CATARACT BY THE MODIFIED LINEAR METHOD OF PROF. A. VON GRAEFE.

By WILLIAM STOKES, Jun., Esq., Surgeon to the Richmond Surgical Hospital, Dublin.

There can be no doubt that the typical operation for senile cataract is the flap extraction, performed with Beer's triangular knife. The eye, after the operation, appears perfectly normal, the iris being left untouched; the sight is also better, there being no circles of diffusion on the retina, consequent on the iridectomy; but, on the other hand, as Mr. Soelberg Wells observes, "these great advantages are often counterbalanced by the considerable dangers which beset the operation. On account of the great size of the flap, there is much risk of the vitality of the cornea becoming impaired, and of its undergoing partial, or even diffuse, suppuration, which may be accompanied by suppurative iritis, or irido-choroiditis. Again, prolapse of the iris is a not unfrequent complication, proving a source of not only great annoyance and irritation, but even of danger, to the eye. The after treatment, also, demands much care and attention, more, indeed, than can generally be bestowed in an hospital, especially in a general one, with no special nurses or ophthalmic wards."

The great liability to corneal suppuration and the other unfortunate sequelæ, doubtless known to all present, which so often supervene after the ordinary flap operation, especially when performed in a general surgical hospital, without any special provisions being made for ophthalmic cases of this sort, have hitherto prevented the great majority of operating surgeons from undertaking the care of such cases. This being the case, a modification of the ordinary flap operation, such as the procedure now under consideration, which, by the consent of almost all ophthalmists, unquestionably diminishes the chance of the occurrence of those unfortunate accidents, which, in so many cases, lead to the permanent loss of the eye as an organ of vision, is, I think, a subject worthy of our most anxious consideration.

The advantages of Von Graefe's method, which is a modification of Waldon and Critchett's operations, may be briefly stated as follows:—

1st. The chances of corneal suppuration are considerably diminished, as the diameter of the flap is so small, and is made in the sclerotic instead of in the cornea. This makes the operation specially adapted for glucosuric cataracts, as from the enfeebled and debilitated condition of persons afflicted with diabetes, the cornea is especially liable to take on suppurative action after extractive operations.

2nd. The operation can be performed while the patient is under the influence of chloroform.

3rd. The chances of iritis are diminished, as that structure is not pressed on or crushed by the passage of a hard lens through the normal pupil.

4th. The removal of the lens is facilitated by the vertical section of the cornea, and in the lens being removed in its own plane, not being in the slightest degree turned on its axis.

5th. The line of section being nearly straight, there is little or no chance of gaping of the wound.

6th. The great rapidity (owing to the wound being in the sclero-corneal junction) with which the wound heals.

7th. The extreme facility of the operation.

In the original paper on the modified linear extraction, by Professor A. Von Graefe, published in the "Archiv. für Ophthalmologie," for 1865, it will be seen that the operation is divided into five stages.

In the first stage, the small narrow-bladed knife, specially constructed for this operation, with its edge upwards, and the flat portion in front, is introduced as peripherally as possible into the anterior chamber. In order to make the inner opening as large as possible, the point of the knife is first directed, not immediately across to the point of counter-puncture, but downwards and inwards: the handle of the knife is then depressed, and the point is directed under the edge of the sclerotic to the point of counter-puncture. Mr. Critchett and Arlt prefer making the section throughout in the cornea, as they think there is less chance of prolapse of the iris and loss of vitreous. When the resistance is overcome, showing that its counter-puncture is effected, the knife must be turned forwards, so that its back must be directed towards the centre of the ideal sphere of the cornea, and then complete the section in this plane by boldly pushing the knife forwards to its entire length, and then drawing it backwards. The formation of a small flap of conjunctiva a line and a half or two lines in length, completes this stage of the operation. A perpendicular section of the cornea is thus made, which greatly facilitates the passage of the lens, and the line of the incision is nearly straight, which prevents gaping of the wound.

The second stage consists in the introduction of a small iridectomy forceps (Von Graefe uses a straight one), and seizing the iris at its most prominent point, a portion of it is gently drawn through the wound. The portion drawn through the wound is somewhat triangular in form, and is divided at its base by two cuts of the scissors, one at each side. The iris

should be excised at the end of the wound, and great care should be taken that no portions remain behind in the section, as they are liable to give rise to great irritation, and prolapse also.

The third stage consists in opening the capsule by a V-shaped incision.

The fourth is removing the lens by gently pressing on the posterior lip of the wound, which is usually sufficient when the cortical portion of the lens is tolerably soft. When this is not the case, Von Graefe recommends the use of a hook, which, in his experience, has been found necessary in about one case in eight.

The fifth and last stage consists in clearing the pupil and adjusting the edges of the wound.

I shall now, with all possible brevity, detail the particulars of some cases of cataract which I have recently operated on by Professor Von Graefe's method.

Case 1.—*Uncomplicated Double Senile Cataract; operated on by the Modified Linear Method.—Successful result.*—Brian Rourke, aged 63, by occupation a porter, was admitted into the Richmond Hospital under my care last April. He stated that about fifteen months previous to his admission into hospital, he observed the sight of his right eye getting dim. This dimness came on gradually; but in about three months he lost the sight in it. About this time he observed that the sight of the left eye was also failing; to use his own form of expression, the dimness in both eyes came on as "if a veil were let down in front of his face." On examination, a double hard cataract was clearly perceived. In the right eye the opacity was so great as to render the patient completely blind; but the left eye was not "ripe" for operation, and with this eye, when the pupil was fairly dilated, the patient was able to see a little. The case was quite uncomplicated; there were no adhesions of the iris, it was normally dilated, and reacted well to the light; the tension of the eyeball was also quite normal, and there was no evidence existing or no previous history of any inflammatory process having occurred in either eye. On April 3rd the operation of extraction was performed precisely in the manner recommended by Professor Von Graefe, and as I learned it from his talented assistant Dr. Theodore Lever, and Dr. Leibreich, the eminent oculist at Paris.

On the 5th of April the bandages and dressings, &c., were removed, and the pupil was found perfectly clear, and there was not the slightest evidence of any inflammatory process existing whatever. There was a slight extravasation of blood in the anterior chamber, which, however, after a few days became quite absorbed.

On April 23rd, with convex glasses, he could see quite distinctly, and was enabled to return to his usual avocations.

Case 2.—*Senile Cataract. Extraction by the Modified Linear Method.—Successful result.*—Anne Douglas, aged 40, a laundress by occupation, was admitted into the Richmond Surgical Hospital on December 28, 1869, suffering from hard senile cataract in each eye. She stated that she first perceived a dimness in both eyes about two years ago, since which time it has been gradually and steadily increasing, until, on admission, the sight was completely lost in the left eye, and the right was in very nearly the same condition. As she was in a very debilitated condition of health, tonic medicines and nourishing diet were freely administered, and on the 12th of January I performed Von Graefe's modified linear extraction.

On examining the patient next morning, the cornea was found to be perfectly clear; there was no pain or other evidence of any local inflammatory action.

Four days after the operation, the wound in the cornea was found to be completely healed, with the exception of one point at the inner portion of the wound, where there was a small portion of the iris protruding. This, however, soon disappeared, and on the 24th all the bandages were removed, and she was able to get up and go about with a green shade, perfectly cured.

Case 3.—*Senile Cataract. Extraction by Von Graefe's Modified Linear Method.—Successful result.*—Mary Sadlier, aged 50, was admitted into the Richmond Surgical Hospital on the 10th of January, 1870, suffering from hard senile cataract of both eyes. She stated that about three years ago she first perceived a dimness in the right eye, and that about two years afterwards the left eye began to be similarly affected. On admission into hospital she was almost completely blind, and had entirely lost the use of the right eye, and had barely any perception of light in the left.

On the 18th of January I performed Von Graefe's modified linear extraction. In this case I found the operation was attended with considerable difficulty, owing to the sunken condition of the eyeball, as well as from the fact that near the close of the operation the patient became sick and vomited. During the operation, after making the iridectomy, a considerable quantity of blood became effused into the anterior chamber; but on the escape of the lens this also passed out through the wound, leaving the anterior chamber quite clear. From these circumstances, a very favourable prognosis was not found. On examining the eye, however, next morning, both the cornea and anterior chamber were found quite clear, and there was very little local pain. The patient continued to progress very favourably only that for some time subsequent to the operation there was a good

deal of lacrymation and pain, which was effectually relieved by local depletion. Ultimately the recovery was a perfect one.

Case 4.—*Hard Senile Cataract. Extraction by Von Graefe's Modified Lineur Method.—Successful result.*—James Gill, aged 49, a blacksmith by occupation, was admitted on the 13th of January, 1870, into the Richmond Surgical Hospital, suffering from the so-called cataracta nigra. He said that about three months previously he first observed a cloudiness in the right eye, and about five or six weeks after he had the same sensation in the left; the dimness of vision increased rapidly, and on his admission he was found to be completely blind of his right eye. The lens was of a dark brownish yellow colour, and there was a peculiarly large and prominent anterior chamber.

I performed Von Graefe's modified linear operation on the 25th of January, and the next day the eye was perfectly free from any symptom of inflammation, and was so completely free from pain that, as the patient expressed it, he was "at a loss to know which eye had been operated upon." This case progressed most favourably, no bad symptom whatever supervening.

In a short communication, like the present one, it would be impossible to discuss a vast number of points connected with the operation of cataract extraction, suggested by the difficulties and accidents that may arise during the operation, as well as subsequent to it, and by the proposals and procedures of Bowman, Critchett, Waldau, Mooren, Jacobson, Beer, Richter, Pagenstecher, Liebreich, and others, as such would necessarily require a much longer time than is at my disposal on the present occasion. I shall therefore conclude by stating that, looking at the fact that in the experience of Von Graefe, and a host of other eminent ophthalmists, that a far larger percentage of recoveries is obtained by the modified linear method than by any other procedure previously adopted, and also that every case of cataract that I have operated on since I adopted this method has been successful, I cannot avoid coming to the conclusion that this modification of the ordinary linear method of extraction is a genuine improvement in one of the most important and attractive branches of surgery. It must, too, also be remembered that equally satisfactory results have been obtained by many other surgeons who, like me, are not specialists in ophthalmic surgery, and whose operations were, like mine, performed in a general surgical hospital, where there are no specially trained nurses or special wards, or special managements of any kind for ophthalmic cases. It is also an operation of extreme simplicity, and there is no difficulty attending its performance that any practical operating surgeon, with a steady hand, and the most ordinary manipulative dexterity cannot easily overcome.—*Med. Press and Circular, March* 30, 1870, *p.* 247.

77.—A MODIFIED OPERATION FOR CLOSED PUPIL AFTER EXTRACTION OF CATARACT.

By Dr. HENRY D. NOYES, Surgeon to the New York Eye and Ear Infirmary.

When severe or protracted inflammation has followed the removal of cataract, and good perception of light remains, the hope of recovering sight depends on the possibility of making a permanent opening through the dense membrane which often occupies the lenticular fossa.

This membrane is found upon the iris as a framework, and consists chiefly of new connective tissue re-inforcing both iris and capsule. It often acquires a toughness which defies the grasp of iris forceps, and renders the usual method of iridectomy unavailing. It is often highly vascular, and the flow of blood into the anterior chamber soon compels the operator to desist.

Iridotomy, that is, a simple incision through the diaphragm, may sometimes succeed, but the aperture is very liable to close.

Another operation, devised by Dr. Agnew, of New York, will sometimes overcome the difficulty. A broad needle is pushed through the cornea and membrane, at the distance of a line from the limbus; while this is held in position, a wound is made at the opposite side of the cornea, through which a small hook is introduced and caught in the hole made by the needle in the secondary cataract. In pulling out the hook this hole is enlarged, and perhaps a portion of tissue brought through the corneal wound. The purpose of the needle is two-fold: first, to make an opening through the membrane; second, to offer sufficient resistance in tearing it.

The second indication of the needle is of great importance; without it either a dialysis at the ciliary ring may occur, or the drag of the hook pulls so hard on the sclera as to cause it to be deeply indented, and the membrane will not yield.

But the help of the stop-needle is not always sufficient to tear a hole in this membrane. I have been foiled in the attempt, and therefore compelled to devise another method.

It is as follows:—The instruments needed are a stop spring speculum, fixation forceps, a rather broad Graefe's extraction knife, two small hooks, and a pair of scissors. It is better to give an anæsthetic. The Graefe's knife is entered at the outer margin of the cornea, and carried completely across in the horizontal meridian, until it emerges at a corresponding point on the opposite side; the wound of counter-puncture must be as large as that of entrance.

The knife is partially withdrawn, and when its point comes opposite the middle of the iris, it is plunged backwards through the diaphragm into the vitreous. In doing this the handle is raised from the horizontal to an oblique position, and by the escape of aqueous at the inner wound the iris comes forward to meet the point of the knife. The wound in the diaphragm should be made as large as possible. When this has been done the knife is quickly withdrawn before all the aqueous humour shall have escaped.

Immediately, before bleeding becomes profuse, a hook is passed through each corneal wound. The operator holds one in each hand. The hooks are blunt at the point, have rather an open curve, are very slender, and made of soft metal, so that the shank may be bent to any angle; the shank is about an inch long.

The hook which enters at the inner corneal wound must have a bend at the middle of the shank to nearly a right angle. This hook it is better to put in first, then put in the hook at the outer wound. The points of both hooks are now to be caught in the wound made through the middle of the iris and traction to be made in opposite directions. The effort must be, to drag out a portion of tissue at each corneal wound, and if any can be pulled through, it must be cut off, and thus the hooks are liberated. If none can be brought out, the hook must be disengaged when it comes to the corneal wound.

The manipulation of the hooks requires tact and delicacy; to rotate the bent hook so that it shall first enter flatwise, and then be turned to catch in the iris, is a little troublesome. When both hooks are fairly caught in the iris, any needful degree of force may be used upon the membrane without danger of doing mischief. The force is expended exclusively upon the membrane to be torn, and inasmuch as one hook pulls against the other, the available amount of force is much greater than can be safely employed by any other mode of operating.

I have yet to find a secondary cataract as tough as not to yield an opening to this persuasion. The pupil thus made is central and abundantly large. It is better to make it large, because there will be ultimately a slight reduction of its size as the corrugated sides of the membrane stretch out.

I have applied this method to three cases, and in all have felt satisfied that a less efficient proceeding would not have secured success.

The degree of reaction after the operation has been moderate, and the eye has been considered well in ten days, or two weeks. —*Ophthalmic Hospital Reports, April* 1869, *p.* 209.

78.—ON THE THEORY OF GLAUCOMA.

By Drs. MAGNI and STILLING.

Magni (Rivista Clinica, 1865), and **Mazzei** (Ibid., 1867), oppose the German theory of glaucoma and propound another. According to the German school, glaucoma is due to an increase of the intra-ocular fluid by exudation from the choroid. The authors object that such exudation, when it occurs posterior to the ora serrata, leads to separation of the retina and to atrophy of the eyeball, but not to glaucoma. If the process be referred to the ciliary region, or, in other words, to cyclitis, we have fresh difficulties arising from the differences between the symptoms of the two diseases. Thus:—

In Glaucoma.	*In Cyclitis.*
The convexity of the cornea is diminished.	Increased.
The iris is atrophied.	Hyperæmic.
The diameter of the eyeball shortened.	Lengthened.
The size of the ocular chambers diminished.	Increased.
The coats of the eyeball thickened.	Thinned.
The crystalline lens diminished.	Normal or enlarged.
The ciliary processes atrophied.	Hyperæmic.
The vitreous condensed, firm.	Fluid, almost watery.
The papilla excavated.	Normal.
The ciliary nerves atrophied.	Normal.

In the presence of these differences it is scarcely possible to assume a similar pathogenesis for the two diseases, which resemble each other only in the single point that in both there is a venous stasis in the retina.

The tension of the ocular capsule in glaucoma is explained by **Magni** as a result of its contraction (*stipamento*), from which it follows that the intra-ocular fluids must be diminished, and that the vitreous humour must be condensed by loss of its serum. Moreover, the atrophy of the ciliary body, on which the normal quantity of the intra-ocular fluid depends, permits a decrease of this fluid to be expected.

According to V. Graefe's theory, the excavation of the papilla is due to the pressure of the increased fluid upon the lamina cribrosa. This texture, according to Magni, is neither elastic nor extensible, and has a more considerable thickness than that of the fibrous capsule of the globe itself. Why is there no excavation in pronounced hydrophthalmus? An excavation from pressure must necessarily have the form of the letter U or V;

while in glaucoma, according to Magni, the papilla assumes the form of a truncated cone, with its smaller extremity directed towards the vitreous.

Magni believes that atrophy of the ciliary nerves affords a complete and sufficient explanation of the course and the changes of glaucoma. By such atrophy the secretory function of the vascular membranes of the eye is diminished, and in the degree that this diminution occurs, and that the vitreous becomes more dense and less bulky, the sclerotic must contract to follow the diminution of its contents. In this way the sclerotico-chorodial foramen, that embraces the optic nerve, becomes much shrunken and drawn in, especially at its inner portion, by which the peculiar form of the glaucomatous papilla is fully explained.

According to Magni, therefore, glaucoma is a chronic disease, depending upon gradual atrophy of the ciliary nerves. The acute glaucoma of V. Graefe is only an already existing glaucoma, complicated by acute choroiditis. The excavation is always accompanied by atrophy of the nerve; and it is difficult to conceive how an inflammation could render the nerve atrophic in a few hours, if it had not been so before. Moreover, there are many cases of acute serous choroiditis without excavation, in which the symptoms in no way differ from those of the cases in which excavation is present. The iridectomy may relieve both the choroiditis and the glaucoma; but since we have as yet only ingenious hypotheses by which to account for its action, the results of treatment cannot afford any test of the correctness of the theory.

Dr. Stilling, of Cassel (Arch. f. Ophth., xiv, 3), attributes the occurrence of glaucoma to an inflammation of the vitreous of a serous character. He does not see how the pus elements in the vitreous can be derived from the stroma cells of the choroid, or the increase of the fluid of the vitreous from a serous choroiditis. It is necessary to assume two forms of plaster, and two of serous choroiditis; the products of one form penetrating through the retina and hyaloid, the other leading to detachment of the retina. As positive evidence of the possibility of inflammation of the vitreous body, Stilling advances new facts with regard to its membranous structure. He repudiates the idea that it is a formless mucous mass inclosed in a structureless membrane; and by a special mode of preparation with a solution of carmine he has obtained evidence, to the naked eye, of a fibro-membranous scaffolding in the fresh eyes of mammalia. The somewhat eccentric canal that passes through the vitreous from the papilla to the posterior surface of the lens, may be easily rendered visible in the eye of a pig. The vitreous and lens being lifted together from the eye, the lens removed, and the vitreous

turned over in sufficient water to immerse it to half its height, a drop of carmine solution must be placed in the clearly visible funnel-shaped space at the posterior pole. The canal will sometimes fill itself immediately up to the anterior pole, although at other times the vitreous must be somewhat turned and moved before the experiment will succeed. If more water be then added, and the whole vitreous allowed to float, the reddened canal will be clearly visible through the transparent parts around it. It is possible that the projection forwards of the lens, and the excavation of the papilla in glaucoma may be due to this canal being overfilled with fluid.—*Ophthalmic Hospital Reports, Nov.* 1869, *p.* 321.

79.—ON THE DIAGNOSIS AND TREATMENT OF STRABISMUS.

By J. SOELBERG WELLS, Esq., Ophthalmic Surgeon to King's College Hospital, and Assistant-Surgeon to the Royal London Ophthalmic Hospital.

[In his clinical lectures Mr. Wells brought forward the following cases to illustrate some of the most important points in the diagnosis and treatment of the common or "concomitant" strabismus, points of which a knowledge is absolutely necessary in order to treat the affection with success.]

The first patient is J. S., a boy of 12 years of age, who has had a convergent squint of the right eye since his fourth year. Before proceeding to examine him, I must state that, in the examination of every case of strabismus, special attention must be paid to the following points:—1. Whether the squint is always confined to one and the same eye, when both are open, or whether it alternates. 2. The size of the squint. 3. The relation between the primary and secondary deviation. 4. The movements of the eyes. 5. The sight and state of refraction of the two eyes, and the presence of diplopia. 6. The cause of the affection.

Let us now very briefly ascertain these different points in the case before us.

1. The strabismus is monolateral—*i.e.*, is always confined to the right eye when both are open, and does not show the least tendency to alternate ; in which case sometimes the right eye, sometimes the left, would be the squinting one.

2. The size of the squint is $2\frac{1}{2}$ lines ; this is easily measured in the following manner:—The patient having been directed to look (both eyes being open) at some object a few feet distant, we note a spot upon the lower lid of the right eye which would correspond to an imaginary line drawn through the centre of the pupil of this (the squinting) eye. The left eye is then closed,

and the right directed upon the object; and the spot on the lower lid is again noted, which now corresponds to a vertical line drawn through the centre of the pupil. The distance between the first and second spot gives us the linear size of the squint. At first these spots may be marked with ink upon the lower lid, but a little practice soon enables us to estimate the distance between them with considerable accuracy. This proceeding is illustrated in Fig. 1, in which the left is represented as the squinting one: A represents the mark corresponding to the centre of the pupil when the eye is squinting; B, the mark corresponding to the centre of the pupil when the eye is fixed upon the object. The distance between A and B gives the size of the squint. I much prefer, however, to employ Mr. Zachariah Laurence's strabismometer (Fig. 2), which consists of an ivory plate (P) moulded to the conformation of the lower lid. Its border is graduated in such a manner that while the centre is designated 0, Paris lines and half lines are marked off on each side of 0. If we now apply the plate to the lower eyelid of the squinting eye, the size of the squint can be read off with great ease and accuracy. The size of the squint should not only be ascertained when the patient is regarding a distant object, but also when he is accommodating for near objects; for in hypermetropia it often increases very considerably in the latter case, so that a squint which perhaps only amounts to 2 lines for distance, may increase to 5 lines when the patient regards some near object.

Fig. 1.

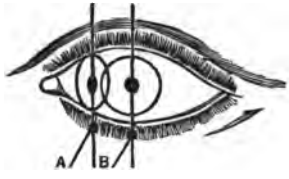
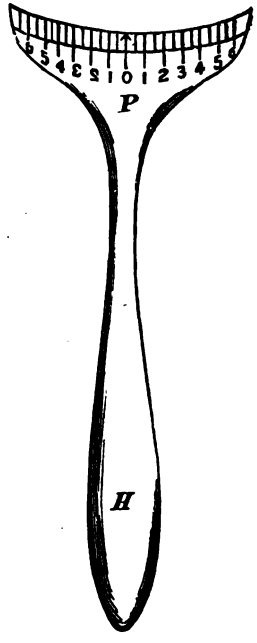


Fig. 2.



3. In the common or concomitant squint the primary and secondary deviations are exactly equal. In this patient the primary deviation is that

of the right eye, and measures 2½ lines. If the left eye is covered, the right moves outwards to the extent of 2½ lines in order to "fix" the object. This movement is accompanied by an inward deviation (also of 2½ lines) of the left eye, which now becomes the squinting one, and this is termed the secondary deviation. Now, in cases of paralytic strabismus, the secondary deviation (for reasons upon which I cannot enter here) always greatly exceeds the primary, and hence this point is of much diagnostic importance in distinguishing between the concomitant and paralytic strabismus.

4. The movements of the eyes are perfect in all directions.

5. The difference in the sight of the two eyes is very great, for whilst the patient is able to read No. 1 of Jaeger with the left eye, he can only decipher letters of No. 16 with the right; its fixation is, however, central. This impairment of vision is due to the prolonged disuse of the squinting eye and mental suppression of its retinal image, for no structural lesion can be discovered. To avoid this impairment of sight, cases of strabismus should be operated on as early as possible, before the sight is materially deteriorated. A very erroneous and mischievous opinion is still somewhat prevalent in the profession, that the operation should be deferred until the patient is grown up. I am very strongly opposed to the practise of unnecessarily postponing the operation, as I have frequently seen great and permanent impairment of vision, from non-use of the eye, produced even within a few months of the first appearance of the squint; this being especially the case in young children. If it is, however, absolutely necessary to postpone the operation, for some length of time, we should direct each eye to be frequently used separately, for we may thus produce an alternating squint, and preserve the sight of both eyes. Hence, in cases of alternating strabismus the sight of both eyes is almost invariably excellent. A good example of this is afforded by the next patient (J. C., aged 14,) who has a well-marked alternating squint of three lines and a half. He generally squints with the left eye, but on closing the right, and causing the left to fix the object, we notice that when the right eye is again uncovered, the left still remains fixed upon the object, the original squint being changed to the right eye. We can thus make each eye alternately the squinting one when both are open, and hence the sight of both is constantly exercised. The benefit of this is well shown in this case, for although the patient has squinted for more than ten years, he can read No. 1 Jaeger fluently with either eye. In the third patient (R. B., aged 10,) I would call your attention to one point—viz., that the fixation of the squinting eye is excentric, in consequence of which its sight is greatly affected. There is a convergent squint of the right eye of about

four lines, which at the first glance appears to resemble the first case; but on closing the left eye, and directing the patient to look at the object with the right, we notice that its fixation is not central, for its optic axis is not directed upon the object, but deviates inwards from it, so that the rays emanating from the object do not fall upon the yellow spot, but upon a portion of the retina internal to it. The sight is consequently much deteriorated, the right eye only deciphering letters of No. 20 with difficulty. The prognosis as to the cure of the squint and as to the improvement of the sight to be effected by the operation is always much worse in such a case than when the fixation is central.

6. Hypermetropia, as was first pointed out by Donders, is by far the most frequent cause of convergent strabismus; for, together with the increase in the convergence of the optic axes, there is an increase in the power of accommodation. At first the squint only occurs periodically, when the patient is looking fixedly at some object near or distant; but it generally soon becomes permanent. All the three patients whom I have presented to you are hypermetropic. Impairment of vision of one eye (due, perhaps, to an opacity of the cornea or lens) is often also a cause of convergent strabismus; but in such cases hypermetropia frequently coexists with the other lesion. Divergent squint occurs most commonly in myopic persons.

In conclusion, I must briefly touch upon a few leading points as to the operative treatment of strabismus. The question as to whether one or both eyes are to be operated on depends solely and entirely upon the size of the squint. By a properly performed tenotomy we are able to cure about 2 or $2\frac{1}{2}$ lines of deviation; hence if the squint measures 2 or $2\frac{1}{2}$ lines, one operation will suffice; whereas if it exceeds this, both eyes must be operated on. But what are we to do if the devitation only measures $1\frac{1}{2}$ lines, so that the tenotomy would have too considerable effect? We must then diminish the latter by applying a conjunctival suture, and thus again somewhat approximating the divided ends of the tendon. Another important question is, whether both eyes are to be operated on at one sitting, in case a double operation is necessary. As a rule, I think it much better to operate at an interval of from three to four days; for we can then estimate with accuracy the effect of the first operation, and the degree of deviation which is to be remedied by the second. Whereas this is quite impossible when both eyes are operated on at one time; so that too great an effect may be produced, and the patient get a divergent squint. To obviate this, the power of convergence should always be tested shortly (within twenty-four hours at the latest) after the operation when the effect of the chloroform has passed off; and if it is found that when the

object (an uplifted finger) is approximated to five or six inches from the eyes, the one eye deviates outwards, a conjunctival suture should be at once inserted, so as to limit the effect of the operation, which is too considerable; otherwise a more or less considerable divergent squint would result.

I generally perform the following slight modification of Von Graefe's operation, which combines the advantages of Von Graefe's and of the subconjunctival operation. The patient having been placed under the influence of chloroform, and the lids kept apart by the spring speculum, an assistant averts the eye with a pair of forceps, which grasp the conjunctiva and subconjunctival tissue just over the centre of the insertion of the external rectus (I am supposing that the internal rectus of the right eye is to be divided). With a pair of finely pointed forceps I then seize a small but deep fold of the conjunctiva and subconjunctival tissue, near the edge of the cornea, and midway between the centre and lower edge of the internal rectus, and divide the fold with a pair of blunt-pointed straight scissors, burrowing somewhat beneath the subconjunctival tissue in a downward and inward direction, so as to make a funnel-shaped opening beneath the subconjunctival tissue. The squint hook (Fig. 3) is then passed through the opening to the lower edge of the tendon; and its bulbous point being pressed somewhat firmly againt the sclerotic, the hook is turned on the point and slid upwards beneath the tendon, as close to its insertion as possible, the whole expanse of the tendon being thus caught up. The points of the scissors are then to be introduced into the aperture, and one blade being passed along the hook behind the tendon, the other in front of the latter, between it and the conjunctiva, the tendon is to be divided close to its insertion by successive snips of the scissors. When it has been completely cut through, the conjunctiva is to be slightly lifted on the point of the hook, and a smaller hook passed upwards and downwards to ascertain if the lateral expansions of the tendon have been divided. If not, they should be cut through; for, even although only a few lateral fibres remain standing, they would suffice to spoil the effect of the operation. In tenotomy of the internal rectus of the left eye, I make the opening *above*, just between the centre and upper edge of the tendon, for this has the advantage of obviating any sinking of the caruncle. If it is found that the effect of the operation is too considerable, so that the eyes cannot be converged up to a point of five or six inches from the eye, but one shows a tendency to

FIG. 3.

deviate outwards, a conjunctival suture should be applied, to diminish the effect of the operation by approximating the cut ends of the tendon. The suture (which is to be applied within twenty-four hours of the operation) is to be inserted in a diagonal direction, passing from downwards and inwards to upwards and outwards, so that the inner and outer lips of the conjunctival wound are united; it may be left in from twenty-four to thirty-six hours.—*Lancet, Nov.* 27, 1869, *p.* 733.

80.—ON THE USE OF SIMPLE SYRUP AS A COLLYRIUM.

By LAWSON TAIT, Esq., Wakefield.

[There are few less satisfactory cases than those of that common affection "granular lids." Whether mild or severe means of treatment are used only temporary relief is obtained in most cases, and ultimately inversion of the edges of the tarsal cartilages takes place.]

In cases of pannus, usually the result of Egyptian ophthalmia, we have a very certain remedy in inoculation—that is, certain in the sense of either kill or cure. Under my own care, I have had one most satisfactory result from this treatment, but I have also had two cases of complete failure, and, of course, of irretrievable mischief. The secret of the successful selection of these cases was revealed to me by my failures; and in a recent conversation with Mr. Critchett I found that it had also been revealed to him. It is that, to be successful, the treatment of pannus by inoculation must be confined to cases where the whole cornea is vascular. In Mr. Critchett's words, "It is a little bit of clear cornea that we have to fear." This, of course, leaves very few cases where the inoculation is applicable.

In looking back over my cases, it appeared to me that the most successful treatment for ordinary cases of granular lids was that which seemed to act by mechanical lubrication,—as in the use of liquor potassæ, or in that of acetate of lead in powder, as recommended by Mr. Dixon. With this view I was induced, many months ago, to use in these cases nothing but simple syrup as a collyrium, and I have met with extremely satisfactory results in some cases,—but not in all. In many cases it may be combined, with great advantage, with other remedies, as with vinum opii, atropia, &c.

Of these cases, I have, unfortunately, not kept any detailed notes; but in all those in which the treatment was successful, it was uncomplicated, and extended over many weeks. It consisted of dropping into the eyes, as often as they felt uneasy, a little syrup, made of the best sugar, and filtered quite clear. It was of such a strength that it did not deposit sugar: about

three drachms or half an ounce of sugar to an ounce of water. During the first few days of its use it sometimes seems to make the symptoms rather worse, but this aggravation soon passes off, and the effect is generally not long in being manifested. The last case in which I used the treatment successfully was a very bad one. A delicate, strumous-looking girl, aged 8 years, had suffered from cloudiness, chronic ulceration, and vascularity of the cornea for nearly two years. The lids were granular, and she had all the other distressing symptoms. She used the syrup only, and in about nine weeks the corneæ became perfectly clear. She has since died of pulmonary phthisis, and some may possibly say that the appearance of this disease had something to do with the cure, or that the cure of the eyes had something to do with the establishment of the disease of the lungs.—*Lancet, Feb.* 12, 1870, *p.* 228.

SYPHILITIC AFFECTIONS.

81.—ON SYPHILIS AND CHANCRE.

By J. Cooper Forster, Assistant-Surgeon to Guy's Hospital.

[There is ample opportunity for observation of syphilitic diseases at Guy's Hospital, and Mr. Cooper Forster having, as is well known, devoted a good deal of attention to the subject, his opinions will be read with interest. No doubt a very great change has taken place in the general knowledge of this disease since Ricord's grand ideas were first made known.]

I hold that there is but one true syphilitic poison, one sore which should be called syphilis. The division into what are called "hard and soft chancres" is, to my mind, objectionable, as the amount of hardness around what is known as a hard "chancre" is often not of a typical character, that is to say, it may be more than what one usually feels in a true hard sore, or the amount of hardness may not be as much as you sometimes feel around a soft sore, especially when that sore occurs on certain parts, for instance, on the prepuce. I, therefore, think it would be better to do away altogether with the term "hard chancre," and call the sore which I wish to designate when using that term, as syphilis. You would speak of a patient as having syphilis, and when you wished to designate the local appearance, as having a sore, or a hard sore. The name "soft chancre," again, is apt to mislead; "chancre" is the term to be used. I am constantly asked by students, Will that soft chancre be followed by secondaries? showing that the word chancre is associated in their minds with true syphilis, or constitutional poisoning. We then have two poisons, one true syphilis or con-

stitutional disease, and the other a mere local mischief, a chancre. I am aware that in attempting to alter the nosology of disease, one is meddling with a very serious subject, still I think that the terms hard and soft chancres, though sanctioned by the Nomenclature Committee of the College of Physicians under the comprehensive title of syphilis, are open to this very serious objection, that in the one case we are speaking of a disease which is frequently as great a curse as can fall upon any human being, in the other we are denoting a harmless local disease, attended by no ulterior consequences, or, at the worst, only loss of substance or cicatrices of the generative organs or in the groin, and certainly not any after mischief.

It is often said that syphilis, or a sore with a hardened base, is a very rare thing in the woman; indeed, some surgeons have stated that they have never seen one, and disbelieve in the existence of such a sore; undoubtedly they are rare, but why? Because these sores, in the early part of their course, are generally, or almost always, painless; nay, they may and do continue so, even after the secondary symptoms have appeared, and they may heal, leaving only a hardness, which exists for a short time, and then, being combined with what one so constantly sees in women, viz., the mucous tubercle, becomes with difficulty distinguishable from that sore. I have frequently called the attention of my dressers and pupils to the existence of a syphilitic sore, as I use the term, in a woman who comes to us at the hospital, not having had syphilis on any former occasion.

Surgeons who maintain the opinion that women are not subject to hard sores, of necessity conclude that all sores may be followed by secondary symptoms, denying the existence of any difference in the feel or appearance of sores in the female. And yet that there are two different kinds of sores *in the male* I cannot doubt; nor, I should think, does any one who looks at the subject with an unbiassed mind. But why should not this be true *of the female* also? May there not be a solution of the question in this manner, that owing to the freedom from pain women with syphilis can continue connection, and in the class of prostitutes who form our hospital patients, do continue their business without any inconvenience to themselves. Nay, in many cases I cannot help thinking they are unaware that they are the subjects of such a fearful malady. In by far the larger proportion of the prostitutes who come under my notice in the hospital chancres or painful sores are present with true syphilis, and it is owing to the presence of these chancres that they have been unable to pursue their business, for which reason they apply for admission, and not for the syphilis, for they have been unaware at the time of examination that they had more than the one sore, viz., the tender soft one, or chancre. Seeing

a secondary eruption on them, I have carefully looked for a true syphilitic sore, and have frequently, though I admit not always, found one. I say not always, for if a patient have been the subject of syphilis prior to my examination, and she should appear in hospital with a recurrent form of secondaries, of course no primary sore will exist, and I cannot help thinking this to be another of the reasons why, in women, the sore of a syphilis is not always to be found. I feel convinced that women will get syphilis, have a rose rash which lasts a short time only, feel no inconvenience from their one sore, and only apply for advice after the appearance of the scaly or papular eruption, when all traces of the primary sore have disappeared, and they have obtained a chancre, for which they present themselves.

In men, again, the painlessness of the sore of syphilis is often a cause of their not noticing it. Who has not seen a patient with a primary sore of syphilis, said to have been observed a day or two before for the first time? And yet one has been perfectly certain, from its size, that many days at least, if not a week or more, must have passed since it first made its appearance; but so free from pain has it been, that the sore has not even attracted the patient's attention; if this be the case with the male organ, which can be easily seen and watched for the commencement of any disease, how much more likely is it that this painless sore shall not attract the attention of the female on a part which she cannot see.

The period at which syphilis may occur after connection or imbibition of the poison is a point of some interest; that it does occur within a week, is undoubted; that it may also appear as long as five or six (or perhaps even more), I have also undoubted proof. In several instances a month has elapsed. In these instances the sore has been small and free from hardness, sometimes for a week; of course, also, the secondary symptoms have been delayed, even to three months. Now, it cannot be admitted, I think, that these periods vary so greatly if we suppose that all sores, primary or secondary, are capable of affording the same virulence of poison. I am forced to the conclusion that there are various intensities of the syphilis poison, according as in one case this poison may have been obtained from a typical hard sore, and in another from a mucous tubercle. If such be allowed, we then, I think, have an explanation of some of the difficulties attending the elucidation of many points in regard to syphilis, as, for instance, that the hardness appears in one patient within a fortnight after connection, in another not for a month or even later. Can otherwise the incubation vary so much for the same poison? In both cases the patient has received the poison, but in modified forms. Again, who has

not seen cases in which multiple sores that were thought to be soft ones have ulcerated slowly for the first three weeks after infection, and yet at the end of that period, without fresh infection, one of them has assumed the nature of true syphilis. True syphilis is one; but the endless varieties and intensities of the poison are not to be attributed, I believe, to the idiosyncrasies of the recipient, as is so often stated, but to the mode of propagation of the poison. In examining a large number of women with syphilis, one fails frequently to find the true syphilitic hard sore, but almost universally, if the patient be the subject of syphilis, she has mucous tubercles in abundance. I therefore am driven to the conclusion that my explanation is the true one. It must be acknowledged that these mucous tubercles are capable of giving syphilis, though they are, undoubtedly, a secondary form of the disease; but as the sore in the mouth of the syphilitic child will give syphilis to the nurse, so will these mucous tubercles give syphilis to the male, and I believe them to be a most fruitful source of contagion. It may be asked, how do I account for the presence of syphilis so frequently in the female as our Lock Ward shows? I certainly do not believe it arises from any kind of soft sore in the male, or any primary sore that has not more or less of a hardened base; and I think it arises more frequently from a secondary manifestation than from a primary sore. I also believe in the possibility of the absorption of the poison of syphilis by a mucous membrane, if there be the slightest abrasion of the surface, without a well-marked hardening *necessarily* following the wound. There is no contradiction between this and my former statement; men often do receive syphilis from a primary hard sore, women more frequently from a secondary.

It would be an important matter to a patient, if we could distinguish between syphilis and a chancre, when he presents himself to us soon after he has first observed anything wrong,—a week, for instance, after connection; but I hold it to be never possible to speak with absolute certainty in reference to this matter. Judging, however, from what I have seen several times, it appears, that, in the minds of some surgeons, every sore is syphilis. I could adduce several instances, and more frequently amongst the higher class of patients, where the surgeon, immediately on seeing a sore, has announced that sore to be syphilis, and has immediately had recourse to mercury; if no secondaries follow all the good result is attributed to the drug, whereas it is quite certain that, mercury or no mercury, had the sore been a true syphilis, secondaries must have followed. I much fear that, occasionally, there is more than ignorance on the part of the surgeon; I would not wish to be uncharitable, but I can hardly imagine how some who I should suppose must

have known better can have assured their patients that the drug that had been used had prevented the after consequences of syphilis. I have repeatedly been told of this or I should not thus dwell upon it. I believe it to be our duty to confess to our patients, in the first instance, our utter inability to tell them whether the sores or sore are local sores or syphilis, and if it or they be unfortunately true syphilis, that the poison is imbibed the moment of connection, and that nothing can avail them in warding off its results. I always explain to any who inquire about the matter, that the poison of syphilis is like the vaccine virus, the moment it enters the system, by whatever means applied, it then and there immediately begins to affect the body. In the case of the vaccine poison—in this instance I will call it a poison—it shows its effects more rapidly than in the case of syphilis, but it is not the less certain to produce its results; the one follows as inevitably as the other, and with as much certainty.

At the period when a secondary eruption may be generally expected the character of the sore itself shows that an eruption must come sooner or later; it may be postponed, it may arrive early. My private cases give me, as an average, seven or eight weeks from connection to the time of the eruption first appearing, though some authors give a longer period, extending to nearly three months. Undoubtedly exceptional cases do occur of the postponement of the skin manifestations to that period, but I think they *are* exceptional, at least I know they have been so in my practice; I have not four cases in which they have been postponed longer than three months.

Amongst the various forms of secondary eruption that have occurred in the patient I have had under my care in the Lock ward, by far the most common is the scaly; the macular is next in frequency; the papular, which is about as common as the scaly, and lastly, the tubercular, with rupia and ecthyma. This does not at all coincide with my private cases, where a roseola is by far the most common; but in enumerating these eruptions in their order, I must not omit to say that mucous tubercles accompany each and all of them, and are an almost constant attendant, being described by the woman as piles whenever they occur in considerable abundance about the anus and the lower part of the labia.

I have mentioned as the most uncommon form of skin disease, unless in very severe cases, and in the older patients, and sometimes even in younger ones who have gone through the various eruptions rather rapidly, rupia. I doubt whether this form of eruption ever occurs, except as a *sequela* of syphilis. That it is closely allied to and sometimes undistinguishable from ecthyma, there can be no doubt; it is usually said to occur at the termina-

tion of the syphilitic desease, but it undoubtedly occurs in young people sometimes very rapidly; at least, I have a patient not twenty under my care now who is suffering from a very severe form of rupia, and though female patients may, and undoubtedly do, acquire syphilis very early, the vigour of the constitution usually wards off this form of secondary disease until later in life than twenty. The only explanation I have of this form of eruption appearing early is the very deficient amount of food many of these women have to put up with.

These patients are, however, usually very amenable to treatment, and the eruption rapidly disappears, especially amongst the younger occupants of the ward,

It seems to be the form of disease which is a kind of transition state to what is known as the tertiary manifestation; and here let me explain the distinction that I draw between these two forms of the same disease. I would not do away with the terms—they are convenient. Secondary disease attacks skin and mucous membrane, and if the deeper seated parts, as in rupia, invariably attacking the superficial first and spreading from these to the deeper structures; whereas the tertiary form of disease is typified by a gummy deposit—it attacks skin secondarily, commencing in the subjacent parts, and involving the skin only when the parts from which that skin derives its nourishment have been destroyed. All the diseases to which the other structures of the body are liable from syphilis—and what part is free?—I class as tertiary.

I am, of course, including here acquired syphilis only. Time is no element in my division; recurrent attack of skin disease is as much a secondary form as the first eruption was, and the fissures and cracks of the tongue, occurring, as they do sometimes, very many years after the poison was first received, are still only secondary manifestations. There is a form of secondary disease by no means uncommon which is very characteristic, viz. ulceration of the skin between and under the toes, and also about the nails, sometimes excessively troublesome to heal, at all times very painful; so far as my experience goes this occurs more frequently in women than in men, though the number of the patients of the latter class far exceed the former.

I now pass on to the soft sore, or chancre, the one by far the most frequently seen; a mere local affection, at the early stage most amenable to treatment, at any stage perhaps painful, but not disastrous in its consequences unless grievously neglected, even when the patient has herself or himself alone to thank for allowing it to have become large. As I have previously stated, this is the most common sore to be found in our female Lock ward, and it is undoubtedly the one for which alone, in by far

the larger number of cases, the women demand admission; it is almost invariably situated at some part of the female organ outside the vagina, rarely, if ever, within the canal, more commonly at the fourchette or at the fold formed by the caruncule myrtiformes than at any other spot; its painfulness and inflamed condition are, I believe, as I have previously stated, the very causes of the patient coming before us. It is rapidly destructive in its action, and most frequently multiple, and when rapidly ulcerating will extend some short distance up the vagina, but its tendency is undoubtedly to spread outwards and involve the nymphæ, which it quickly destroys. In the older prostitutes one frequently finds either a scar of large size, or destruction of part of one or other of the nymphæ, as evidences of the ravages of this species of sore; indeed after a chancre I should say the evidence of past venereal disease exists far more permanently than after syphilis. I have just stated that these sores are multiple in character; they seem to increase in number in women more rapidly than in men, owing to the excessive moisture and secretion of the generative organs in the former. Thus, if seen on one labium, they are almost sure to be observed also on the opposite, at some spot to which the secretion from the original sore has easily reached; indeed, it always appears to me wonderful how any part of the vulva escapes contamination. The most distinctive sign to be noticed as indicative of the whereabouts of a sore is the almost universal presence of œdema. And if this be local, or in one labium only, there most assuredly will be found a sore in connection with it as the source of irritation. The natural tendency of this sore seems to be after some weeks to heal spontaneously, but before it does so it may involve the destruction of a vast surface, and sometimes of a considerable depth of tissue.

I will now offer a few observations as to the treatment I usually adopt, first, in a case of syphilis, or hard sore, and, secondly, in one of chancre, or a soft sore.

In speaking of the treatment of the sore of syphilis one has to deal with it in its several stages—firstly, when it is not a typical sore, but suspicious, a mere abrasion; again, when it is well marked; and again, when it is combined with a chancre, or when it takes the form of a soft sore or chancre, becoming indurated.

In all sores when first seen, no matter of what kind, provided there is no marked hardness I invariably destroy the surface with strong nitric acid carefully applied, frequently under the influence of chloroform, and then with the nitrate of silver rubbed in upon the destroyed surface. This latter application has usually a peculiar power of relieving the pain occasioned by the acid; if in the course of five or six days, the slough

having separated, there is not a decidedly healthy action in the sore, I again apply the acid, after both applications dressing the part with wet lint. Great care must be used to apply the acid fully to each sore, or any one to which it is not applied quickly will again affect the ones that have been destroyed (provided there are more than one). I believe in all sores appearing a few days after a suspicious connection this is the plan of treatment that should be adopted. Supposing the sore to be true syphilis, or about to become hard, no harm is done; and if it be a chancre or local soft sore only, it most assuredly will be thus destroyed, and a healthy granulating surface will arise, which will quickly heal. To the women in Patience Ward this application is sometimes made in a thorough manner with great difficulty, owing to the folds about the generative organs, and hence the necessity of always applying the escharotic in their cases whilst they are under the influence of chloroform. I have several times, when the sore has been isolated, and when, consequently, I have suspected its true syphilitic character, removed the sore and a considerable portion of the surrounding tissue completely, including the semi-hardened portion, and in all cases, without exception, even where there has not been the slightest other evidence of syphilis poisoning, have found the sore return on the excised spot. These experiments were made by me many years ago, and I was then brought to the opinion I have before expressed, that the moment of connection is the moment of the reception of the poison. So stretched is the delicate skin covering the penis in a state of erection, and so acutely sensitive does it become in the state of orgasm, that if a poison exist it is doubtless absorbed and taken up by the system immediately the organ comes into contact with the poison. In the female, particularly in the older prostitute, local manifestations of disease are rarer, and we seldom have to apply our remedies to their external organs, owing to the absence of that extreme delicateness and susceptibility to impressions observed in the younger women. If I am called upon to see a sore that has existed some weeks, presenting the typical manifestation of hardness, and particularly if there exist any enlarged glands in the groin, I consider the application of an escharotic to the sore useless; I generally, under these circumstances, order small doses of mercury at once, either by fumigation, by inunction, or internally in the shape of pil. hyd. Should, however, there be the slightest doubt in my mind of the true syphilitic character of the sore, I defer the remedy until the eruption appears, believing that I should do but little good by hastening its adoption. The good effects of mercury no one but those who wilfully shut their eyes to the beneficial effect of a therapeutic agent can doubt; that it cures

the disease I do not believe, that it expedites the time of the patient's recovery I have not the smallest doubt.

In the pustular forms of syphilitic skin diseases, such as ecthyma and rupia, a grave question sometimes arises as to the propriety of administering mercury; there is no doubt that, in some cases, the patients are much benefited by a careful administration of the remedy. I have no faith in improving the general health, as it is called, previous to the exhibition of the drug. The patient appears to me to be suffering from the effects of the syphilis, and if that can be benefited by good diet, &c., there is no necessity for mercury; but if, as we often see, the patient continues cachectic and ill, with an increase in the size and number of the sores, despite the good feeding, then I have frequently given mercury with the most marked benefit. But, as a rule, it is undoubtedly not applicable. And here, for the first time in the treatment of syphilis, that invaluable drug iodide of potassium comes to our aid; for many years now it has filled up the gap just where a something was wanted in the treatment of syphilis, but to get the good effects of the remedy the doses, I believe, must be large. I have now for the last twelve or fourteen years given iodide of potassium in these cases of rupia, as in all forms of so-called tertiary syphilis, in does of from ten grains to two scruples three and four times a day, with the greatest advantage. Many of my former pupils can, I am sure, call to mind what they considered my heroic doses of this drug. In advanced secondary or tertiary forms of this disease, I generally begin with the smaller dose, and if a decided effect is not produced upon the disease in the course of a few days I quickly increase it until I achieve what I know the drug will do, that is, induce a healing action in all spreading sores. Indeed, I may here mention that in some of the old-standing cases of tertiary syphilis I recommend the patients to use this salt with their food instead of common salt, and with great advantage. Whenever, indeed, patients are the subjects of what are known as "the gummy products" of syphilis, or with the so-called "cancer of the *face*"—a part of the body this tertiary form of the disease seems particularly to like—they are most quickly cured by the use of this drug; and if they are not quickly treated with it the most frightful deformity is left. Patients have just cause to blame their surgeons if they overlook this condition.

As regards the treatment of the soft sore or chancre, my rule is, and I feel more and more convinced of the propriety of the practice, to destroy the surface and obtain a healthy sore. To the student, or young practitioner, I would say—If you find that one application is not sufficient, do it again; and if a second does not answer, apply the acid a third time. But if the

first application be made whilst the patient is under the influence of chloroform, even when the sore has attained a large size, the second is rarely required; or, if a second should be required, a third is still more rarely necessary. If patients are seen within the first week of infection two applications of nitric acid are never necessary, but unfortunately the women in Patience Ward rarely or never present themselves so early as the first week unless the sore has become much inflamed and irritated, either by neglect, bad living, or the most frequent source of irritation, viz., too frequent connection; in these instances they frequently apply for advice early, the sore or sores having become so irritated that further connection has been rendered impossible without extreme suffering. Under these circumstances a poultice is always applied over the vulva, and the patient kept in bed a day or two before any remedy is used. In some women, owing to the size of the soft sore or chancre when first seen, it becomes practically almost impossible to employ an escharotic to destroy its surface; in these cases, and sometimes in men who object to have the sore destroyed, or where the sore is situated so closely over the urethra as to threaten the laying open of that canal, I do not think it advisable to apply nitric acid. A lotion composed of ferrum tartaratum and extract of opium is a very good remedy, and one I use largely, but it has the disadvantage of staining linen, and, consequently, like nitrate of silver, must be used carefully. Sores seem to be benefited by this application when they are disposed to spread and are painful, but, as I have before observed, the natural tendency of this, as all other diseases of the human body, is to get well, and it is sometimes difficult to give the credit where it is deserved.—*Guy's Hospital Reports, Vol.* xv, 1870, *p.* 157.

82.—ON THE TREATMENT OF CONSTITUTIONAL SYPHILIS BY CREOSOTE AND CARBOLIC ACID.

By JOHN MORGAN, Esq., Surgeon to Mercer's Hospital, and the Westmoreland Lock Hospital, Dublin.

Having treated, during the last twelve months, a large number of cases of constitutional syphilis by the administration of creosote in full doses, I would draw attention to its value when given in the early stages of constitutional infection, and specially where mercurial treatment is inadmissable, or when patients are of the strumous diathesis.

It must be admitted that no one remedy or line of treatment can boast of unvarying success in this disease, not even mercury itself, however carefully exhibited. I cannot claim for the creasote treatment a uniform success, but I have found it most

decidedly useful and curative in many instances of constitutional manifestations.

Various, indeed, have been the suggestions as to the nature of the syphilitic poison; if analogous to hydrophobia, or a ferment in the system, or an "algoid vegetation," as lately suggested, it is, unhappily, too true that the poison, once introduced, is so capable of causing an alteration of the whole organism that, to use the words of Lancereaux, "the individual has acquired the syphilitic constitution, and is no longer a normal being, but an individual deviating from the type, having undergone a kind of degeneration."

The cases in which I adopted this method were chiefly those suffering from the first influences of this "syphilitic constitution," such as mucous patches, roseola, papular, eruption, and cachexia. The usual plan I followed was, keeping the patient in bed as far as possible, allowing a nourishing diet, and the use, at least every second night, of a warm bath, to which two ounces of carbolic acid were added; the patient should remain in this bath half an hour, or even longer, so as thoroughly to influence the skin. The creasote mixture I prescribed was—

℞. Creasoti, ʒ j.; mucilaginis, ℥j. Tere et adde—Tinct. opii. ʒ j.; aquæ menthæ pip., ℥vij. M. sumat coch. i., magnum, *quater in die.*

Usually within ten days an amelioration takes place, and gradually the signs fade. Should iritis or any acute sign appear requiring mercurial treatment, this remedy can be given as well as the creasote mixture.

The following selected cases illustrate successful treatment; of course all hygienic adjuvants must be allowed their share in the recoveries, such as regular hours, non-exposure to cold, moderation in the use of food and stimulants, equable temperature, &c.

The following exemplify cases where the primary and constitutional signs co-existed:—

Case 1.—*Never previously affected; papular eruption, complicated with struma.*—A patient, aged 19, strumous, and with enlarged glands in the neck, came under treatment for a primary sore, which resisted auto-inoculation, and was of one fortnight's duration. At the third week papular eruption appeared, accompanied by mucous patches and slight pains. Under the influence of creasote mixture and carbolic acid baths the signs disappeared in about six weeks.

Case 2.—*Never previously affected; papular eruption with suppurating strumous glands in the neck.*—A patient, aged 19, with two suppurating glands in the neck, came under treatment for a primary sore, which resisted inoculation, and was of one fortnight's duration. The sore was indurated, but there were no

inguinal enlargements. In about three weeks from the appearance of the sore, and before it was healed, papular eruption and pains supervened. Creasote and carbolic baths effected a cure in about four weeks.

Case 3.—*Patches and roseolar eruption.*—A female patient, aged 20, affected for the first time with a non-indurated sore at the fourchette of one month's duration, without any inguinal enlargements. Suffered at the expiration of a month from copious patches and roseolar eruption; auto-inoculation performed once, was unsuccessful. There was no osteoscopic pains, and but little cachexia. Treated by carbolic acid baths and the creasote mixture.

Case 4.—*Papular eruption and pregnancy.*—A female patient, aged 26, affected for the first time with a large non-indurated sore at the vagina, capable of auto-inoculation, and with double acute, but not suppurating bubo. Suffered before the healing of the sore from a most copious papular eruption and cachexia, being pregnant about five months. Under the influence of the creasote mixture the rash disappeared, and her health improved. She produced a well-developed plump child at full-time; the mother remained in good condition.

Case 5.—*Roseolar eruption and pains.*—Patient, aged 17, suffering for two weeks from a sore for the first time; capable of inoculation and re-inoculation; was affected by copious roseolar cachexia and pains; the rash was very abundant, and acute in its appearance. Treated, also, by creasote and carbolic baths.

The following illustrate some cases occurring subsequent to the healing of the primary sore:—

Case 6.—*Pustular eruption and cachexia.*—Patient, aged 23; six months after the appearance of the primary suffered from cachexia and pustular eruption of three weeks' duration before seeking treatment. Treated by the creasote mixture. The carbolic baths gave much relief to the pustular eruption.

Case 7.—*Papular eruption and cachexia.*—Patient, aged 20; six months after the primary suffered from papular eruption and cachexia; the character of the sore is not known. Treated, also, by creasote and carbolic baths.

Case 8.—*Ulcer of the uterus and roseola.*—Female patient, aged 25; suffering for three weeks from roseola and patches; has also a well-marked ulcer around the os uteri, but is otherwise in good health. The inguinal glands are enlarged. Treated by creasote and carbolic baths. The ulcer uteri was treated by topical applications.

Case 9.—*Sore, accompanied by suppurating bubo.*—Female patient, aged 18; suffered from sore at labium, accompanied by a suppurating bubo; and in six months developed patches and most extensive papular eruption. She was treated by tonics and

creasote. In six months she contracted another sore at the fourchette, which resisted inoculation, although she was suffering at the time from papular eruption. Treated, also, on this occasion by the creasote mixture and carbolic baths.

Case 10.—*Married woman infected by child-bearing.*—A strong healthy woman, married seven months, produced at that time a dead child, decomposed. She had observed for about two months blotches on the skin; never had any primary sore, but copious mucous patches. Treated by creasote and carbolic baths.

Case 11.—*Patient advanced in years, suffering severely.*—A respectable tradesman, nearly 60 years of age, contracted a sore last July; it occupied the greater part of the corona, and was auto-inoculable. For six months the man remained without a sign, when a most copious rash of a large papular form appeared, also pains of a severe character supervened, and the condition of the patient became miserable in the extreme. By the use of creasote, combined with iron and good diet, the patient convalesced rapidly.

I have also treated infected infants with drop doses three times a day, but in them mercury is so entirely satisfactory that no more practical remedy can well be used.

These cases, illustrating various forms of the affection, are interesting, and speak for the efficacy of the method; the larger the dose the patient will take the better, up to six or eight minims three times a day. I have healed some cases by creasote enemata night and morning; ten minims to two ounces of fluid, thus avoiding any objection as to taste.—*Medical Press and Circular, Jan.* 12, 1870, *p.* 17.

33.—ON A NEW METHOD OF TREATING GONORRHŒA BY INJECTIONS.

By ARTHUR E. DURHAM, Esq., Assistant-Surgeon to Guy's Hospital.

There is no doubt that gonorrhœa ir itself is simply a local affection. And yet in the male subject it is rarely amenable to purely local treatment. Copaiba, cubebs, oil of sandal-wood, and other medicines, administered internally, are as much in vogue as ever, if not more so.

We very seldom have occasion to prescribe such remedies for gonorrhœa in the female. The disease, as a rule, is confined to parts which are easily and safely reached by injections, and over which the urine does not pass. The so-called specifics, taken by the mouth, are, therefore, neither necessary nor useful.

In the male the case is altogether different. The mucous membrane of the urethra is from time to time liable to serious

irritation from the passage over it of acid urine; and the suffering part is neither easily nor always safely reached by injections as they are ordinarily used. Consequently, it is necessary, in the first place, to deprive the urine of its irritating acidity. And further, it is often deemed desirable to make the urine the medium through which remedies may be applied to the inflamed membrane over which it passes. The first-mentioned effect is produced easily enough by proper regulation of the diet and the free use of alkaline medicines. The second can only be accomplished, so far as we know, by the administration of drugs which are often very nauseous to the patient, and are notoriously liable to disorder the stomach and more or less affect the general health. In some cases, in spite of all the skill of the prescriber and all the care of the pharmaceutist, these drugs cannot be tolerated in any form, and the gonorrhœa almost comes to be considered the lesser evil. On these and other grounds, which are sufficiently obvious, the local treatment of gonorrhœa by soothing astringent injections is commonly recommended and adopted. But such treatment as ordinarily carried out very often, indeed, utterly fails to do any good beyond amusing the patient until the gonorrhœa has, as it were, worn itself out.

Most surgeons of experience who have carefully watched their cases of gonorrhœa will, I think, agree that in very many instances the prescribed injections have been of little real benefit; that in some instances positive mischief has been done; and that in comparatively few cases only have good results been manifestly effected.

The explanation is obvious. In the large proportion of the cases, if not in all, in which the treatment has failed to produce any beneficial effect it will be found that the injection has not regularly reached the whole of the affected part, and perhaps even has never done so on any occasion. The injection has simply flowed round the end of the syringe, and issued from the urethra at once. It has been gently injected, and has been prevented from penetrating far enough either by the swelling of the mucous membrane or by contraction of the muscular coat of the urethra.

In the cases in which mischief appears to have been done it will generally be found that the injection has been forced too far on, or has been prevented from escaping with due readiness from the orifice of the urethra. Under such circumstances it is easy to understand how gonorrhœal matter may be carried onwards, and infect parts hitherto healthy. Thus in some cases may be explained the extension of the inflammation towards the prostate, bladder, and testicles. Instances are not uncommon in which the use of injections is followed by cessation of

the discharge and a generally comfortable condition of the urethra. The gonorrhœa of the anterior portion of the mucous membrane is, in fact, temporarily cured. And yet inflammation may spread along one or other or both of the vasa deferentia, and epididymitis or orchitis may supervene. A similar result, no doubt, occasionally happens in cases in which injections have not been used, and in which, therefore, the explanation suggested cannot hold good. But so far as my experience goes, gonorrhœal epididymitis is most frequently met with in cases in which injections have been carelessly or unskilfully used.

In the cases in which injections have manifestly proved curative it will be found, I believe, either that the inflammation has been comparatively slight, and has not extended far along the urethra—that is, not further than about an inch—or that unusual care and skill have been exercised by the patient in carrying out the directions given him, and that the directions given have been explicit and judicious.

It is all but useless, and it may prove worse than useless, to prescribe an injection, and simply to tell the patient to use it so many times a day.

The directions given, I believe, by most surgeons of experience are somewhat as follows. The patient is told to insert the nozzle of the filled syringe into the urethra; to support the penis, and to press the edges of the orfice of the urethra gently against the syringe, so as to prevent the immediate escape of the injection; to compress the urethra in the perineum, or at any rate at a point beyond that to which the inflammation extends, in order to prevent the genorrhœal matter being carried onwards; and then to inject gently until a sensation of distension of the canal is produced. The fluid thus injected is to be retained for a minute or two, and then, by the removal of the syringe, allowed to escape. This process is to be repeated several times successively.

Now, that such directions are well intentioned there can, I think, be no doubt; but as a matter of fact many patients find considerable difficulty in carrying them out. Some, indeed, have told me they considered it physically impossible to do as they had been directed. I have more than once been asked this question:—"If the right hand manipulates the syringe, and the finger and thumb of the left hand are occupied in supporting the penis and closing the orifice, how can either hand be made to compress the urethra in the perineum or elsewhere?"

[With the view of rendering the treatment of gonorrhœa by injections easier, safer, and at the same time more effectual than it certainly appears to be as ordinarily practised, Mr. Durham, devised, some long time ago, an instrument made by Mr.

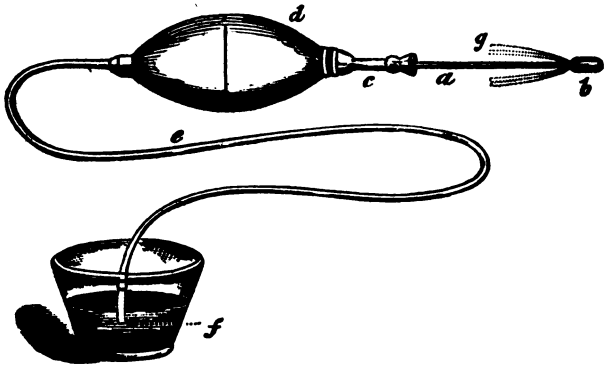
Hawksley, with Mr. Baker, Holborn, consisting of a slender tube of vulcanite (*a*), terminated at one extremity by an elongated bulb (*b*), and at the other connected by means of the elastic tube (*c*) with the small hand ball enema syringe (*d*), which is filled through the elastic tube (*e*). At the junction of the slender tube (*a*) with the commencement of the bulbous expansion is a ring of minute perforations, which are made in such direction that when the syringe is in action the fine streams of fluid ejected through them pass backwards and upwards, as indicated in the figure (*g*), and not straight onwards.]

The method of using the syringe, and the principle on which it acts, require but little explanation. The heavy extremity of the tube (*e*) is sunk in the fluid to be injected, and the syringe is filled. The tube (*a*) is then introduced, well oiled, into the urethra until the bulb has passed a little beyond the point to which the inflammation is known or supposed to extend. The hand ball is then gently compressed, and the fluid issuing from the perforations flows from behind forwards, and escapes from the urethra after having safely and perfectly washed over the inflamed mucous membrane. The fluid is prevented from flowing onwards towards the bladder by the closeness with which the inner wall of the urethra becomes applied to the bulbous extremity of the tube. The stream can be kept up as long as may be considered necessary, or a different fluid may be used without the inconvenience, and perhaps pain, of removing and reintroducing the instrument. Thus, after having thoroughly washed the mucous membrane by a stream of plain water, the supply tube may be transferred to the lotion bottle, and an astringent solution applied. The outward flow may, of course, be temporarily checked, if thought desirable, by pressing the lips of the urethra against the tube; and thus the mucous membrane may be put somewhat on the stretch, and the fluid may be retained in contact with it, instead of simply washing over it.

My experience during the past two or three years, in about seventy cases, has amply proved the correctness of the principles upon which the instrument, thus briefly described, was designed to act. The results of its use have been most satisfactory.

But experience has also suggested some slight improvements on the original pattern, and has shown the great importance of attention to certain points in the construction of the instrument. I have heard of several cases of failure, and of one or two cases of some slight mischief, which have arisen from the use of faulty instruments made in imitation of that I am describing, but modified by the makers without the guidance of surgical know-

ledge. At the risk, therefore, of seeming tedious, I have ventured to describe in detail, and somewhat minutely, the instrument in its improved form. The instrument, as I believe it should be made, and as it may now be obtained,* is pretty accurately represented in the figure.



The urethral tube (*a*), with its bulb (*b*), should be at least three inches or three inches and a half in length, otherwise the bulb cannot, as a rule, be conveniently passed thoroughly well beyond the inflamed part. The slender portion of the tube should be, according to circumstances, the size of a No. 3 or a No. 4 catheter. Many specimens of the instrument have been made far too short to be serviceable. The bulb should be olive-shaped, and about three-eighths of an inch in length; it should slope gradually and uniformly into continuity with the slender portion of the tube, and should present no sharp edge or shoulder. Any such sharp edge may cause abrasion of the mucous membrane in withdrawing the instrument. The greatest circumference of the bulb should be equal to that of a No. 7, 8, or 9 catheter. The size to be employed must depend upon the condition of the urethra at the time the instrument is used. It is easy to change one urethral tube for another, the rest of the apparatus remaining the same. A small and a large-sized urethral tube may be obtained with each syringe, or the size may be selected. The largest size which will pass through the orifice of the urethra, without much difficulty or pain, should be employed. It will be recollected that the calibre of the

* Messrs. Krhone as well as Mr. Hawksley have taken great pains in carrying out my suggestions, and by them, as also by Mr. Millikin, and other makers, the instrument is now supplied.

urethra is smallest at the orifice, and consequently that the bulb which has passed through the orifice may be passed on along the canal with comparative ease. If the bulb is too small to be well grasped by the urethra, it will not so effectually prevent the onward flow of the injection towards the bladder as it should do. The portion of elastic tube (*c*) should be of sufficient calibre to slip easily over the urethral tube, so as to admit the changing of the tube if necessary; it should be so short as to bring the hand-ball conveniently near, and to enable the urethral tube to support the penis in the desired position. The left hand is thus left free to compress the urethra whenever needful.

The facility with which this instrument can be used, and the thorough and effectual manner in which by means of it the urethra can be washed out, are sufficiently obvious. Theoretically, it appears to afford a ready method of treating gonorrhœa on scientific principles. Practically, as I have said, it has been already proved to be of very great utility. And I have no doubt that further experience will still more fully establish its value.

It may be used with advantage, I believe, in almost any stage of the malady. But its use is obviously most appropriate in the earlier and later stages.

During the acute stage, when the mucous membrane is much swollen and excessively tender, the introduction of the instrument may be too difficult and painful. But from my small experience of its use in this stage I am inclined to believe that if only the introduction of the instrument can be accomplished there is no stage of the malady in which more speedy and obvious benefit is obtained. In gonorrhœal ophthalmia, the more acute the inflammation the greater the need for the continuous washing away of the matter and the application of appropriate remedies; and the more evident, too, is the beneficial effect. In urethral gonorrhœa the conditions are sufficiently similar to indicate similar need, and the probability of similar good result. The old method of injection is absolutely inapplicable, because the fluid cannot be injected far enough, or, if injected, is certain to carry on the infectious matter and spread the mischief. Besides, the repeated introduction and withdrawal of the nozzle of the syringe, which are necessary, cause repetitions of severe pain to the most tender part of the urethra. But in the method I am advocating, when once the bulb of this instrument is fairly passed beyond the inflamed portion of the mucous membrane, little or no pain is occasioned, and the gentle continuous current of tepid water or soothing injection which can be kept up is most pleasant to the patient, and directly beneficial to the suffering part.

In the earlier and later stages of the malady—that is to say, before the acute stage is reached and after it has subsided—the introduction of the instrument is easy; and, as a rule, the good effects of its use soon become manifest.

I have been assured by several patients whose personal experience in gonorrhœa has been considerable that the disease has been absolutely cut short and prevented from becoming established by the free use of mild astringent washes as soon as the first threatening indications have shown themselves.

I have seen many cases in which the disease has been cured in from ten days to three weeks without the supervention of any acute symptoms.

I have also seen many cases in which, after the acute stage has been passed, the cure has been completed in a comparatively short space of time—in some instances in the course of a few days,—and that without the internal administration of any of the so-called specifics.

It is unnecessary to dwell upon the obvious fact that, if the inflammation has extended along the urethra beyond the point to which the tube can be passed, it is not to be expected that the use of the instrument can effect, although it may aid, the cure.

The stage of the malady and the condition of the urethra must determine the nature of the solution it is best to employ. In every case, however, before using any solution it is best to wash out the urethra thoroughly by a stream of tepid water, and the injection should always be practised immediately after urine has been passed.

If the urethra is but little irritable, as in the earliest and the later stages, astringent solutions may be employed with the greatest advantage. But these solutions should not be too strong. One to two grains of alum, or two to four grains of sulphate of zinc, or a quarter of a grain to a grain of chloride of zinc, or the same proportion of nitrate of silver to an ounce of water, will, I think, be found to constitute solutions of sufficient strength. Continuous washing with a weak solution is better, as a rule, than a short application of a stronger one. If the urethra is very irritable a solution of acetate of lead, with a small quantity of acetate of morphia or extract of belladonna, is useful. It seems to me very probable that a lotion containing copaiba in suspension might prove very applicable in some cases. But I have not yet had sufficient experience on this point to enable me to make any decided statement.

It is unnecessary to enter upon the discussion of the general treatment and management of patients suffering from gonorrhœa. My object in the present communication has been simply to describe and recommend a method of local treatment which

at one period or other in the course of this troublesome malady is likely, I believe, to prove of service, at any rate in a very large proportion of cases.

It would not be right to conclude without stating that many years ago Mr. Hilton devised and recommended a syringe having a long nozzle terminated by a bulbous extremity. His object was to a certain extent similar to that which I had in view in designing the instrument I have described.

I venture to believe, however, that my instrument possesses advantages which are peculiarly its own, and that, used in the method above recommended, it will be found of considerable service in the treatment of this common and often very troublesome malady.—*Guy's Hospital Reports, Vol.* xv., 1870, *p.* 471.

MIDWIFERY,

AND THE DISEASES OF WOMEN AND CHILDREN.

34.—REMARKS ON A MODE OF APPLYING THE SHORT MIDWIFERY-FORCEPS, PRODUCTIVE OF LESS PAIN TO, AND DISTURBANCE OF, THE PATIENT, THAN THAT USUALLY ADOPTED.*

By Dr. JAMES BRAITHWAITE, Leeds.

There is a large class of cases, especially in primiparæ, in which, perhaps from some slight disproportion between the head of the child and the pelvis of the mother, from constitutional debility, or from accidental rupture of the membranes early in the case, the labour is exceedingly tedious, and the recovery afterwards correspondingly tardy and imperfect.

Now although, as an obstetric instrument, the forceps is everything that can be desired in cases of a severe type, yet for those in question it is hardly suitable. The instrument is seldom at hand when wanted, and has to be sent for, to the great alarm of the patient and her friends. It is, moreover, necessary, before it can be used, to move the patient to the edge of the bed, to empty the bladder, and to make other preparations, which arouse her fears still more; and they are not lessened if she hear the metallic click of the blades.

It is unnecessary for me to picture to you the questioning one has to undergo from the friends, the trouble required to calm the fears of the patient, and the unjust blame to which we may be subjected by our female critics for using instruments which "never were needful when they were having a family." You will doubtless be able to recall to mind times when you have waited many weary hours, wishing you had some means of assisting the descent of the head, yet where you hardly liked to apply the forceps, though the waning powers of the patient made you anticipate such a termination to the case. Doubtless, it has been during the ample time for thought unwillingly enjoyed at such times, that the vectis was invented—the whalebone loop, the suction-tractor; also, more recently, Sheraton's steel fillet and Debenham's whalebone fillet. There is no doubt,

* Read before the Midwifery Section at the Annual Meeting of the British Medical Association in Leeds, July 1869.

however, that none of these instruments can compare with the forceps for safety to both mother and child, if only the latter can be deprived of its objectionable features. If, although really an instrument of two blades, we can have one possessing the portability of the vectis, so that when going into the country or to a place some distance from home, this blade can be slipped into the breast-pocket, and there remain out of sight, and without the chance of the noise which would arise if two blades were so placed; if we can apply this blade almost without the knowledge of the patient, without causing her the least pain during its introduction, and without disturbing her position in the bed, unless too near its foot to allow of the proper movements of the handles during extraction—it appears to me that we shall have all we want. There would be, moreover, this additional advantage, that one instrument would do for all cases, whether those in which a little judicious assistance will be of great advantage to the patient, although not *absolutely* necessary to the termination of the case; or serious cases of impaction.

I am not writing a paper advocating the very frequent use of the forceps; but I cannot here refrain from reminding you how fatal ergot is to the child, when given in tedious labours from disproportion; and how preferable aid of the nature we speak of is, with the view of saving the life of the child.

Acting upon the hint conveyed by Sheraton's steel fillet, I have had an instrument constructed, consisting, as you see, of an ordinary pair of short forceps-blades, accurately adapted to one another—the convexity of one to the concavity of the other, and connected firmly together in this position by a metallic clip, which is easily removable when it is wished to separate the blades. This is the position in which they are intended to be maintained when not in use, and during introduction. When not in actual use, the blades are protected by a small leather case. They are used in the following way. The external parts being separated by the first two fingers of the left hand, the blade is to be slipped in between them (and it is sufficiently narrow for that purpose). Keeping the point in close contact with the head, it is to be passed directly into the hollow of the sacrum, precisely as the vectis is introduced. In the ordinary position of the fœtal head, the point of the blade will now be over the left eye, but above it about two inches. The blades must now be separated, and glided one downwards and the other upwards, until, as regards the pelvis of the mother, a line running from the concavity of one blade to the concavity of the other would be exactly at right angles to its antero-posterior diameter. With exercising a little pressure, they will now lock, and the case

may be proceeded with. In the first or common position of the fœtal head, the upper blade will be on the right temporal ridge, just within the line of the hairy scalp; and the lower blade just behind the left ear. In the second position, this will be reversed, and the lower blade will be just behind the right ear. The occipito-posterior positions nature will have almost invariably converted into occipito-anterior by the time the head is sufficiently low down in the pelvis for the application of the short forceps. To those who may object to the parts of the fœtal head grasped in this way of using the forceps, I may rely as follows:—

1. I have not recommended its use in this position, except in the less severe class of cases. At the same time I may say that I have applied it at least forty times in this position, and that some of these cases were very difficult; and only in one case was there any bad result for which I could blame the forceps—the child dying in convulsions soon after birth. This might have resulted simply from the severe labour.

2. The long forceps seizes the child in almost exactly the same position, being applied at right angles to the pelvis of the mother, without reference to the position of the child's head; and, when the head has been brought down by them into the cavity of the pelvis, it is not thought necessary to alter its position on the head, or to substitute the short forceps applied over the ears.

3. Compression is effected by elongating the head exactly in the direction in which nature does it. A child's head is not compressed laterally in labour; it is elongated, the anterior part of the skull being flattened.

4. Compression is not effected in a dangerous direction. It is not along the same plane as it would be if from the forehead to the occiput. The line of pressure extends diagonally across the head, and from the top to the base. The lower blade lifts, as it were, the occiput into its hollow; whilst the upper slightly compresses the vertex. At the same time, the hold of the instrument being to a great extent a side to side one, we have almost all the advantages of the latter mode of grasp, in depressing the vertex, and rotating the head under the pubic arch when the time for that movement occurs.

I need hardly say that there is nothing to prevent the blades being passed separately in the usual manner, if thought desirable from the degree of impaction being considerable, and the difficulty in extraction expected to be great.

Before concluding, I will enumerate the advantages which are offered by the use of this form of forceps; and, in so doing, I leave the subject to your judgment.

1. It is light, portable, and can be carried in the breast-pocket, where it is invisible, and where it cannot be lost in travelling.

2. Its application is much more rapid than that of the ordinary short forceps; indeed, I think a minute and a half or two minutes is generally sufficient.

3. It causes so little annoyance to the patient, that its introduction and application to the head may be said to be painless. Now, this certainly cannot be said of the ordinary way in all cases; for, when the head is distant an inch and a half from the perineum, the blades have to press considerably upon the external parts of the mother to get the points round the convexity of the head.

4. It is much safer to the child than the use of ergot, which should be confined to those cases in which the sole cause of delayed delivery is sluggish pains.

5. It is unnecessary to disturb the position of the patient, unless she be too near the foot of the bed. It is also needless to empty the bladder, unless we can feel it sensibly distended with urine.

6. Compression is effected naturally, the elongation of the head being assisted. I may here remark that, unless a certain amount of compression be exercised by forceps, the traction-power is confined entirely to the tips of the blades, and injury is likely to result.

7. A peculiarly distressing accident sometimes results from the use of the short forceps across the ears; viz., paralysis of the portio dura. There is no risk of this when it is applied in the way of which we are speaking.

8. The same instrument may be applied in the ordinary way in severe cases of impaction, if the operator think it desirable.

Of course, any ordinary pair of forceps can be applied in this way, except that each blade must be introduced separately.

The best way of avoiding rupture of the perineum is, as the head presses on the external parts, to unlock the blades, and to let the handles cross one another as much as they will. The blades will now lie closely adapted to the head, and will not stretch the perineum at all. At the same time, they can be reapplied instantly, if necessary. This is better than entirely withdrawing them, which should only be done when the head is pressing well upon the perineum and stretching it; the pains being sufficiently strong to render it evident that no further artificial aid is required.*—*British Medical Journal, Dec.* 25, 1869, *p.* 673.

* These forceps are made by Messrs. Joseph Gray & Co., of Sheffield.

35.—CASES OF SUCCESSFUL VERSION AFTER FAILURE OF THE FORCEPS.

By Dr. J. BRAXTON HICKS, F.R.S., Physician-Accoucheur to Guy's Hospital.

[So many cases have now been published in which, after the forceps had been employed unsuccessfully, delivery of a child has been accomplished by turning, that the advantage of turning in such cases has been quite established.]

If there is considerable doubt as to whether the forceps will fail, I would always prefer version as the primary operation, provided the state of the uterus were favourable, and that chloroform could be given. But where there is a fair chance of the forceps succeeding, I should always try it first.

The analysis of the cases show four of vertex presentation, where forceps was tried and failed, but by version the child was delivered. Three of these lived; in the other, although its heart beat at birth, yet respiration could not be established. In this last and in one of those that recovered inflation of the lungs was employed artificially. In one case the head presented by the face; vectis and forceps were unsuccesfully employed, but version succeeded so far as delivery was concerned, but the child was dead. This case is, perhaps, scarcely one of the class to which Sir J. Simpson referred, but the treatment may, I think, be advantageously extended to some face presentations, particularly where the brim is small. In one case version was tried in a succeeding labour as the primary operation with complete success. I have to this added one case in illustration of the employment of version as a primary operation where craniotomy had been employed in a former labour. In this case the child's life was not saved; still, it clearly shows how closely these cases may be selected when guided by careful consideration of the history and actual relations of the head to the pelvis as determined by manual examination.

Case 1.—*Failure of forceps; version; child's heart beating, but soon ceased.*—Mrs. —, Irish, aged 36, mother of nine children, five delivered by instruments, all of them being still-born; two born by natural efforts lived. She had been in very severe labour for twelve hours. I found the head at the brim; a scalp tumour had formed; head resting on pubes; as far as could be ascertained, the antero-posterior diameter of the brim was between three and three and a quarter inches, the right side evidently straighter than the left. The outlet was of natural size. Head was in occipito-posterior position, slightly inclining to forehead presentation.

I applied the long curved forceps, without chloroform, and tried to readapt the head, using traction up to the limits of

what I considered safety, but found impassable resistance. Turning was then performed, chloroform having been given, and after some little difficulty the head again was engaged in the brim. By firm traction it slowly passed through, but with considerable resistance, and seven or eight minutes elapsed before the head was born. The funis was pulseless, but the heart slowly beat. Laryngeal catheterization was employed, and in a short time the beats reached to 120 p. m., but respiration could not be established, and the heart gradually ceased action. The rest was natural. The examination of the child showed nothing but extreme venous congestion of the pia mater, and a large sanguineous scalp tumour.

The patient recovered well.

Case 2.—Failure of forceps; version successful; child living.—Mrs. —, aged 25, in her third labour. The first labour was moderately long; in the second the arm presented, the child was turned and delivered alive. Labour had been on twenty-four hours when I saw her; the os uteri fully expanded for six hours. The pains had been good, without advance, the head resting on the pubes. I tried to alter its position as much as possible, from the exterior and the interior, without success. Forceps was then applied, and the head was rotated in many directions, while traction was employed as firmly as considered safe, but without any advance. Turning was then employed, and after very firm traction the head passed the brim, and a living child was born, which cried lustily before I left. It was of full size.

The traction employed to bring the head through the brim was as severe as I have ever employed, indeed, more than one would think it possible a child could bear without injury; still, as the child must have died otherwise, I considered it worth the risk.

The mother did well, and was delivered by version next time of a live child after another labour of twenty-four hours without progress.

Case 3.—Failure of forceps; version successful; child living.—Mrs. M., a stout woman with large abdomen; has had four labours, all the children males, all born by assistance of forceps; two living, two dead.

She had been in labour thirty hours when I saw her. The pains had been strong till lately, with pulse rising; tongue dry; and she was beginning to be exhausted in strength and spirits. The head had not entered the brim. The transverse diameter of the cavity seemed less than the antero-posterior diameter, which appeared good. Forceps were employed, but they pressed very firmly against the sides of the pelvis. After

employing as much traction as I dared I advised version, which was performed by the resident obstetric clerk, Mr. Eager. Much difficulty was experienced in bringing down the foot and raising the head, in consequence of the firm contraction of the uterus. Chloroform was then administered, and the hand passed up again to see the cause, when a kind of hour-glass contraction was found above the head, preventing its rising. I passed slowly my hand by it and retained it *in sitû*. Shortly, as I have before found, the spasm relaxed, and then, bringing down my arm, seized the foot in its descent, and brought the breech through. The body very soon was born, but very much difficulty was found to the withdrawal of the head. However, by steady pulling, it passed in from one to two minutes. The child was living, and did well. The mother recovered also well.

Case 4.—*Failure of forceps; version successful; child alive.*—Mrs. —, aged 25, primipara. When I saw her she had been in labour twenty-four hours with severe pain, which latterly had become continuous. The fœtal head had very slightly entered the brim, but was pressed down firmly on it by the persistent action of the uterus. The pulse was quick; tongue furred and dry. The antero-posterior diameter was calculated at three and a half inches by digital measurement, and the side loops were imperfect. I scarcely expected forceps to succeed, but they were put on, but no amount of justifiable traction produced any result. She was, therefore, put under chloroform, and the resident obstetric clerk, Mr. Sells, turned. Some difficulty was experienced from the state of the uterus in accomplishing the revolution of the fœtus. External pressure, however, lifted up the head to the fundus, upon which the breech descended, and the uterus extruded the body of the child. But the head remained so fixed in the brim that it seemed impossible a live child could be born. However, after a few minutes, the head slowly descended through. There was also much obstacle in the pelvic cavity, but eventually the head was wholly delivered. The heart was pulsating. By warm bath and laryngeal catheterization I was successful in establishing respiration, and the child lived.

The mother recovered excellently.

Case 5.—*Face presentation, chin posterior; vectis and forceps tried without success; delivery by version; child dead.*—Mrs. —, Irish, aged 35, primipara; small woman; pelvis rather below standard; the face had been presenting some hours, but pains moderate. The forehead had been anterior rather to right side, but not fixed, and it seemed easy to move the chin round. The waters had escaped some time, and the uterus grasped the child tightly. The os was fully open.

The vectis and forceps had been tried without results, the latter slipping, and an attempt also had been made to turn, but the uterus prevented it.

When I saw her I attempted reducing the face to a vertex presentation. But although I nearly succeeded, yet ultimately the face presentation remained. I again applied the forceps, but, as they slipped and no movement was obtained, I withdrew them, and, giving chloroform, was able to push the head aside sufficiently to bring down the leg, and in a very few minutes the child was born, but there was no sign of vitality in it. The rest of the case was natural.

Case 6.—*Failure of forceps; version; rupture of the uterus; head detached; death of mother.*—I did not see this case till the woman was dying. I found the head left in uterus, the uterus ruptured in front through half its length. I endeavoured to deliver the head by the cephalotribe, but the patient died before I could do so.

I found three medical men had been engaged at the case. She was an exceeding fat woman, a multipara, and, as the pains had been ineffectual, the forceps was employed. The uterus was much anteverted, but the brim did not appear contracted. However, as the head did not advance, version was employed, with great difficulty from the contracted state of the uterus. During version the uterus ruptured. Suddenly she became collapsed and gasping; renewed efforts were then made to deliver, and the body separated from the head. In this state I first saw her; I tried first the crotchet and then cephalotribe, but it was a very hard head, so that its seizure was difficult, and, as she was rapidly sinking, I gave up further attempt as useless.

The obliquity of the uterus and the ossification of the fœtal head seemed to produce the difficulty in delivery of the head; and the rigid state of the uterus coupled with, probably, some degeneration of its fibres, rendered turning a fatal procedure.

Case 7.—*Craniotomy in first labour; version in second; child dead.*—The patient had been in labour eighteen hours, during which the os uteri had opened slowly, and had been fully dilated about six hours when I saw her. The pains had been all through very forcing and painful. I found the uterus firmly and continuously contracted around the fœtus, with slight rhythmical pains. She had a distressed anxious expression. The head was firmly fixed in the antero-posterior diameter, so as to require some little pressure to raise it, when it moved with a jerk. She was anxious to have chloroform, which was given her. I then carefully measured the pelvic diameters, and found the antero-posterior to be about three inches and a half. There

was deficiency on the right side of the oblique. Comparing the head with the pelvis, I felt certain it could not pass by forceps, and, as the only other chance of saving its life was by version, the resident obstetric clerk, Mr. Pearse, turned without real difficulty, though slowly, in consequence of the state of the uterus. When the head again touched the brim it remained fixed about four minutes, the face and occiput touching the sides of the cavity firmly; but after fair traction the head was delivered, though too late for life to be saved. Artificial inflation was useless.

The adherent placenta was detached, but she did well.—*Guy's Hospital Reports, Vol.* xv, 1870, *p.* 501.

86.—ERGOT OF RYE AS A THERAPEUTIC AGENT.

By Dr. J. WARING-CURRAN, Dublin.

Although the chief uses of ergot of rye are, for the most part, confined to those affections of the uterus over which it seems to exercise a specific action, I have been induced to give extensive trial of the drug in other complaints; and as I have found most satisfactory results from its administration, the following paper has been written in the hope that ergot of rye may be more frequently exhibited as a medicine, and that the practitioner may be reminded that in it he has a most potent therapeutic agent of reliable efficacy in other diseases, apart from those affecting the uterus.

In Parturition.—The physiological action of ergot of rye upon the parturient uterus in exciting contractions of the unstriped muscular fibre is familiar to all, and the *constant* pains which it induces so characteristically differing from genuine labour pains. This action is entirely produced through the ganglionic nervous system by affecting the muscular coats of the blood-vessels, and thus diminishing their calibre. We are told by Dr. Brown-Séquard, as the result of a series of experiments made by himself, that the blood-vessels of the pia-mater of a dog under its influence became smaller, and that the reflex action of the spinal cord was diminished to a great extent.

In three-fourths of the labours attended by myself, I have exhibited ergot with most salutary results. I have never observed any ill effects from it, when judiciously given, to either mother or child. I never attempt it unless the os is dilated and dilatable; and primapara cases, if the pelvic development be natural, and the os be not rigid, never prevent my giving it. The cases we read of, and lecturers have told us about its destructive effects upon the mother, and its poisonous

properties to the child, experience teaches me, must have been cases where ergot was improperly given.

I have used extensively the liquid extract prepared by the action of ether and spirit upon powdered ergot, and the tincture too; but on neither have I the least reliance. Some time ago I was sent to assist a medical gentleman; upon my arrival I found the child's head in the vagina, and complete inertia; the gentleman in attendance told me he had given the liquid extract in large and repeated doses without any appreciable therapeutic action. I immediately prepared a fresh infusion—the preparation I invariably employ—added to it some borax; in twenty minutes its action commenced, and within an hour the child was born. I do not say that in such a case the short forceps would not have done equally well; but people, as a rule, have, in private practice, so great a hatred to instrumental deliveries, and are so apt to attribute every little trivial subsequent complaint to their use, that I have not used the forceps as frequently as formerly.

When studying midwifery, some years ago, at the Rotunda Lying-in Hospital, Dublin, I painfully noticed—and the observation has made no little impression upon me—that the students and embryonic midwives were compelled to allow poor women to continue in labour, hour after hour until nearly exhausted, because the rules of the institution forbade their interference, unless an over-fed and morose female superintendent was awaked and consulted. The educated student, revolting at such consultations, allowed the case to linger in preference. As I now reflect, I have not a particle of hesitation in saying that many of those confinements might have been safely and expeditiously concluded hours previously, had the best informed and senior student been permitted to prescribe a dose of ergot. To keep a woman five minutes in labour longer than she might be is an unnecessary and a great cruelty. The freshly prepared infusion with borax will demonstrate its action in twenty to twenty-five minutes, or earlier if the anterior os be gently irritated with the forefinger. So far as ergot is related to the accoucheur, I should feel disappointed arriving at the bedside of a parturient woman without it. I write not inconsiderately making this remark, for I thoroughly deprecate the exhibition of any drug given indiscriminately and recklessly, and can thoroughly comprehend the issue of a case of distorted pelvis, or rigid os (when antimonial wine is requisite) where any could be found foolish and inexperienced enough to prescribe ergot.

Flooding after Labour I have never failed arresting by a full dose of infusion of ergot, at the same time lowering the patient's head, elevating the pelvis, and firmly applying the padded binder. I have observed in the practice of others that plugging

the vagina had in several instances to be superseded by a full dose of ergot of rye, and that with the desired effect.

Menorrhagia is a term now so inaptly applied to the varied forms of uterine hemorrhage, requiring different treatment, that I purpose devoting a paper to this subject alone, and to the effect which heat along the dorso-lumbar region produces by inducing hyperæmia of the vasomotor nerve centres related to the uterus, and through the increased currents along the nerves, causing contraction of the uterine vessels, and thus arresting menorrhagia; but here I must confine myself to those varieties of uterine hemorrhage best cured by the ergot of rye. What I am pleased to call the *strumous abortive predisposition*, met with in patients of a scrofulous habit, who have become very frequently impregnated, who suffer from constitutional debility, from leucorrhœa when the menorrhagia has exhausted itself, or when arrested by treatment, demands the exhibition of ergot when the hemorrhage is present, which it rarely fails to command. Menorrhagia from obstructive cardiac disease at either the mitral or aortic orifices, congesting the pelvic viscera, that associated with a diseased portal system, that consequent upon a scorbutic state of the system, and genuine menorrhagia—*i.e.*, an increase of the catamenia continuing for an unnaturally lengthened period and returning before the time calculated upon, without organic lesion, are the forms or varieties of menorrhagia to be benefited, to be checked and cured by the freshly prepared infusion of ergot and borax. Menorrhagias dependent upon ulceration of the os uteri, due to the existence of polypoid growths, or owing to the presence of malignant excrescences, or the effect of retroflexion of the uterus, do not come among the category of cases to be affected beneficially and permanently by ergot of rye, although I have used the drug for the purpose of pressing down the growth of a polypus to be snared, a malignant or an ulcerated surface to be cauterised.

Amenorrhœa occurring in the plethoric is best treated for a few days with strong salines, aloetic purgatives, or medicines which act upon and increase the circulation of the large intestines, and then closely followed by two-ounce doses twice a day of the infusion of ergot, prepared according to the British Pharmacopœia. Amenorrhœa in those who have only *changed* a few times, and in those of tender years, and amenorrhœa of chlorotic women, should have citrate of iron, spirits of ammonia, and tincture of nux vomica administered for three weeks in full doses, and the fourth week be ordered hip-baths, and from one ounce to an ounce and a half doses of the infusion of ergot thrice daily.

In these cases, as in the parturient, vomiting is sometimes induced, being the direct effect of the drug upon the muscular coat of the stomach. Accordingly, to prevent this, I direct the albumen of an egg or some gruel to be partaken of before the medicine, and this with good results invariably.

Hæmoptysis I have frequently arrested for a time with ergot, with good effect in the commencement of phthisis; but I should not be disposed to prescribe it lest vomiting should be set up in the hæmoptysis which sometimes accompanies the advanced stages of pulmonary consumption.

Hæmaturia.—I have found great benefits from the tonic effects of ergot upon the blood-vessels, in causing a diminution of their calibre, and arresting hemorrhage from the kidney. I can safely say that its effects are superior to either turpentine or the vegetable acids in this complaint, and that the same observation applies to the tonic effect it produces on the muscular fibre of the bladder in those cases of general atony which come under our notice, and for which so little permanent good can be done.

Constipation of the Paralytic is strikingly remedied, when the most powerful cathartics fail, by occasional doses of ergot, which sensibly diminish the amount of blood present in the spinal cord and its membranes, give tone to the muscular fibre of the bowels, and thus propel the fæcal matter to the rectum.

Fatty Degeneration of the Heart.—I have had and still have two patients suffering from this complaint, who are very materially assisted by occasional doses of ergot. I can only compare its tonic virtues to that of carbonate of ammonia, but as experience is limited I cannot write emphatically.

As an Injection in Gleet I believe I have been the first to use the infusion of ergot in this complaint, and I have not yet failed. I employ the Pharmacopœia infusion, and direct its being injected three and four times in the day. I observe the tonic power it imparts to the urethra.

When the injection is thrown along the urethra, I direct the meatus urinarius to be firmly pressed against the nozzle of the syringe, so that the ergot may lie for five minutes in the urethra; for experiment has taught microscopically that the first effect of ergot locally applied to a raw surface, is, 1stly, to increase the circulation; 2ndly, to suspend the circulation; 3rdly, the circulation recovers itself, is still disturbed, and irregular, or spasmodic, showing that the contraction and relaxation of the muscular coats of the arteries are subservient to the will of the ergot, hence, undue contraction producing gangrene. These series of phenomena upon the blood-vessels of the urethra, at all events set up healthy action and cure a foul disease.

I hope this paper may have the effect of bringing more prominently forward one of our most valuable drugs, that in the

iseases I mention the practitioner in extensive practice may be nduced to test its value and give us the result of his experience, or it is only by combining results that accuracy is established. 'o the point: an accomplished surgeon, at my suggestion, has mployed infusion of ergot as an injection in a case of chronic atarrh of the bladder. The reports of the case are valuable, ut they are not corroborated by other cases, hence my delicacy n alluding to what another will publish; for in other similar ases its tonic virtues may not prove as effectual.

P.S.—The inconvenience and trouble of preparing a fresh in- usion of ergot on every occasion—the tincture and extract of he Pharmacopœia being unreliable—combined with the fact hat the patient knows the nature of the loathsome dose about eing administered, has induced my consulting Mr. Edward Long, of the eminent firm of Hamilton, Long, & Co., of Dublin, egarding the great want of a new and reliable preparation. I am happy to state that in a few weeks a great desideratum will be accomplished, and that the profession will have an oppor- tunity of testing the power of a new preparation, which will have the advantages of being *sweet*, *concentrated*, and *permanent*; the ergot, being first exhausted with glycerine, which is strained off, the residuum is digested in spirits, and then evaporated to the consistence of syrup. The two solutions are joined, so that we get all that is soluble in water—infusion, and all that is soluble in spirit—extract, tincture, &c.; but a more full and practical description of the method of this new preparation of ergot I retain for a future contribution, when the utility and therapeutic power of the preparation is established.—*Medical Press and Circular*, *Nov.* 17, 1869, *p.* 397.

87.—NOTES ON ERGOT.

By Dr. CHARLES RONAYNE.

Ergot of rye is one of those drugs possessing very decided and powerful actions, but usually very uncertain in its effects, and this I think may be in a great measure attributed to the faultiness of its preparation.

It unquestionably excites contraction of the non-striated muscles generally, whether those of the organs or vascular system, and particularly when given with other remedies is a valuable agent.

It is some years ago since I drew the attention of the pro- fession to its efficacy in dilated or lacerated arterial and arterio- capillary lesions, whether dependent on organic or functional disease, and suggested a mode of extracting its therapeutic

properties, differing from the process of the pharmacopœia. That article appeared in the *Medical Press*, and elicited valuable commendations from many of my professional friends that confirmed my views, but, more particularly, I have been confirmed in those opinions by the recent writings of Drs. Waring-Curran and Hirschfeld, and other gentlemen on the same subject.

In 1865 I gave my experiences of, and experiments with, ergot and digitalis combined, in hæmoptysis from cardiac, and from pulmonary disease, in albuminuria from renal congestion, in menorrhagia, in serous effusions from capillary engorgement, in fine in all the conditions dependent on vascular dilatation and laceration; and I need not say how pleased I was to see in some years afterwards that Dr. Dobell endorsed my suggestions by his treatment of the same complications with the same combinations; he, with his usual good judgment, combined them in a very elegant form, and a more powerful combination than digitalis and ergot in many diseases there may not be, but I still think that a great deficiency in their pharmacopœia preparations exists.

If we just consider its (ergot) structural and chemical composition, we can hardly fail in arriving at the best means of extracting its medicinal powers. It is a cellulose fungoid, containing a heavy oil, a volatile oil and resin, mucilage, extractive matter and some salts. Now we know that each particular preparation as tincture, extract, and infusion will not extract and retain all these ingredients, and I consider it necessary that all the ingredients should be retained in the medicinal preparation until more certain knowledge than we at present possess of their individual actions is known. An infusion will not get at the heavy oil, or resin, and will dissipate the volatile oil, and a tincture will not dissolve out the salts, nor act on the starchy principles, so we see that the pharmacopœia preparations fail in giving us all the elements and properties of the drug. Dr. Waring-Curran saw this, and requested Mr. Long, a very clever pharmaceutist, to devise some preparation that would present us with all the ingredients and be thus a more certain remedy. Mr. Long ingeniously devised the glycerine one; now I am not satisfied with this. Glycerine is certainly a solvent for many substances, and at the same time, an emulsifying medium, but it fails in acting on many of the active principles of plants. Since Mr. Long's preparation was announced, I have carefully experimented with glycerine, and I find it does not dissolve the organic salts, it does not *extract* the oleaginous elements, and will only mix with the amylaceous when mechanically made to do so, therefore it fails in getting at the saline, the oily and starchy ingredients of the ergot; besides, it is apt to take up the elements of fermentation, and gradually be converted into

Propionic acid. I will not in this paper weary you with my experiments with it.

Now, as I said before, knowing its composition we can strike off its solvents, and combine them in a single preparation. Ether and alcohol for the oils and resin, water for the salts, the mucilage, and extractive matters, unite these and we have in fact the dissolved assimilable drug, leaving behind only the inert cell walls of the cellulose; the difficulty is to get the ether and water impregnated with their several matters to unite, and the *Sirop d'ether* of the Paris codex enables us to do this, or rather M. Regnauld's modification of the *Sirop d'ether*.

Strangely enough in the preparation of the extract of ergot of the British Pharmacopœia, ether is used to extract the oils and resin in order that they may be rejected, in deference I suppose to Bongeau's ideas that they were inert or poisonous, notwithstanding that Dr. Baker showed the contrary, and indeed it is not likely that the oils, particularly the volatile oil and resin, should be inert considering that they are usually the active principles of plants, and in the case of ergot we know that that which has lost its peculiar odour (due to their presence) is valueless.

What I recommend is, first crush the ergot into fine powder, pour the ether and alcohol on it, allow it to rest in stoppered bottle for twelve hours, at a temperature of 60°, then pour off and press well the mass so as perfectly to extrude the absorbed liquid; the volatile principles being now dissolved out, boiling water is to be poured on the residuum and infused for twelve hours at about 150°, thus extracting the mucilage salts, and extractive matters. Regnauld's *Sirop d'ether* comes into requisition now to enable us to mix the etherial tincture and the watery infusion, and this I do according to his recommendation, by strongly agitating the two with crystallized sugar, until a perfectly homogeneous syrup is produced, this makes a very elegant and certain preparation; great care and nicety are required in the manipulation, but it fully repays the trouble by the certainty of its action. It will be found useful in these lesions before mentioned, and in hemorrhagic and congestive conditions attended with excited cardiac action may be combined with digitalis, and in chlorotic conditions with iron, never forgetting that it seems a specific excitor of uterine action, no matter whether the womb be gravid or not, also unsafe to administer in parturition, unless one is ready to deliver within an hour of its administration, for undoubtedly it possesses some poisonous properties, especially apt to affect the fœtus.

Anyone wishing to procure the preparation made in the manner I have mentioned can do so, from Messrs. Boileau and

Boyd, chemists, who have communicated with me on the subject, and to whom I have given the process in its more minute details. —*Medical Press and Circular, April* 6, 1870, *p.* 267.

88.—PRURITUS OF PREGNANCY CURED IMMEDIATELY BY THE USE OF TOBACCO.

Mrs. W., a woman of nervous temperament, became pregnant a few months after her marriage. In addition to the usual derangement of the alimentary canal, she soon experienced a severe itching all over her body. The skin was of a perfectly normal appearance; the pruritus, however, caused her great excitement and soon produced nervous spasms. For several weeks every possible external and internal remedy was used in vain. A decoction of walnut-leaves gave her some relief when in the seventh month of pregnancy. Then a violent pyrosis and neuralgia of the dental nerves supervened. In order to alleviate the latter, she was advised by her husband to try the effect of smoking, when the pain as well as the itching and pyrosis disappeared immediately. Mrs. W. smoked one cigar every evening until she was prematurely delivered by a fright, after 8½ months.

Fourteen months afterwards Mrs. W. again became pregnant, and was again affected, in the fourth month of pregnancy, with pruritus followed by pyrosis. She did not immediately resort to smoking, from dislike of this habit, until the evil increased, when the smoking of one cigar again rendered her perfectly comfortable. She was this time also delivered prematurely in the seventh month, without any known cause to account for it.—*(Tribune Medicale) American Journal of Obstetrics, May* 1869, *p.* 136.

89.—INDUCTION OF PREMATURE LABOUR.

Dr. SKINNER is much in favour of Dr. Tyler Smith's plan for producing premature labour, by means of injecting water into the uterus. In the case of a woman with contracted pelvis, he throws up a quantity of warm water into the uterus, having first passed the long tube of an ordinary stomach-pump an inch and a half within the os uteri. After continuing to throw up water for about ten minutes, the os was found next morning slightly dilating and the head presenting far up. Pains came on pretty rapidly, and when the os became fully dilated, the membranes were ruptured, and a living male child was born eighteen hours after applying the water-douche.—*Medical Press and Circular, April* 6, 1870, *p.* 275.

90.—ON UTERINE HEMORRHAGE AFTER LABOUR.

By Dr. ROBERT BARNES, Obstetric Physician and Lecturer at St. Thomas's Hospital; Examiner in Midwifery to the Royal College of Surgeons.

[The following is an abstract of a paper read before the Obstetrical Society of London.]

The author endeavoured to define the conditions upon which arrest of hemorrhage after labour depended, the action of the remedies in common use, and the indications for resort to particular remedies. The remedies almost exclusively used depended for their efficacy upon their power of exciting contraction of the uterus: this presupposed nerve force enough to respond to excitation; but when this was exhausted, remedies failed. It became then necessary to seek a new power that would act under the condition of exhausted contractility. This was found in styptics like perchloride of iron, which acted by coagulating the blood in the mouths of the open vessels, and corrugating the inner surface of the uterus. Acting exactly when ordinary means failed, it was a new power to save women from dying of hemorrhage. Examining the action of ergot, compression of the uterus, and cold, he urged that these should not be trusted if they failed to act quickly; for if they so failed it was probably because contractility was gone. If persevered in beyond this point, they did harm. Ergot and cold added to the depression; kneading might bruise the uterus; all were apt to occasion some form of puerperal fever. The perchloride had in several cases been followed by death, when used for injecting nævi; but this case was essentially different from that of injecting the uterus. In his own practice he had observed three orders of cases. In the first all recovered well, the hemorrhage being immediately stopped; in some of these death would almost certainly have ensued but for the remedy. In the second series recovery occurred, phlegmasia dolens supervening; but phlegmasia dolens was not unusual after severe hemorrhage, and some of these cases would have died but for the remedy. In the third, death followed, but the patients were moribund when the remedy was applied; it came too late: here the remedy was transfusion. The practical lesson resulting from a review of these cases was to observe the rule he had laid down, not to persist too long in the use of cold, kneading, and other remedies, but to resort to the perchloride before collapse had set in. Dr. Barnes showed a convenient case constructed by Krohne and Sesemann, containing a set of his dilators, a Higginson's syringe with uterine tube, and a bottle for perchloride of iron.

[Dr. CLEVELAND observed that he has used an 8-oz. india-rubber bottle, which can be readily attached to a flexible male catheter. He considers this preferable to a Higginson's syringe.]

Dr. WYNN WILLIAMS had used it for a long time, although not exactly in the same manner as the author of the paper, but in a way which he might call the ready method. This consisted in taking a sponge, on which some of the tincture of the perchloride had been poured, and passing it into the uterus through the hollow of the hand already introduced, after of course previously emptying the uterus of clots, and then sponging the interior of the uterus with it, leaving it in the uterus if seen fit, with a string attached. He thought this plan less objectionable than injecting a considerable quantity of fluid. The stains on the hands of the operator were readily removed by a solution of oxalic acid, or salts of lemon.

Dr. BRAXTON HICKS most cordially agreed with the whole paper. He wished to add, however, a few remarks. In the first place, he thought there was a considerable difference in different cases as to the condition of the internal surface of the uterus after the expulsion of the placenta. In some uteri examined after death, the large apertures of the sinuses described by many authors were absent. There were, of course, the arterial openings, and those of their return veins, of considerable size certainly, but not very large. In others, it would be found that the sinuses, in their oblique passage through the uterine walls, occasionally abutted on the line of separation of the placental decidua. When the placenta was removed, then the feeble wall gave way, and severe loss would result, unless the uterus contracted quite firmly. In the former case it did not require that severe uterine contraction, and the perchloride would readily act. In the latter it would probably be found that even the perchloride would fail to arrest this great stream. Enormous gushes he believed to be the result of a pre-accumulation which had been going on unobserved. To one class of cases Dr. Barnes had not alluded—viz., placenta prævia, where the cervical zone was relaxed after delivery. In these, the perchloride applied to the surface was of much value. In severe cases of abortion, also, when the uterus had been emptied, he had used it frequently with complete success, and without any untoward result. He used a somewhat weaker solution than Dr. Barnes.

Dr. PLAYFAIR referred to the importance of aiming at the prevention of post-partum hemorrhage, and urged the careful following down of the contracting uterus with the hand. On the subject of the value of the perchloride, he could but add his testimony to that of the previous speakers.

Dr. TYLER SMITH, after eulogising the paper of Dr. Barnes, said that he believed that few cases of dangerous flooding would occur if in all cases a full dose of ergot were given immediately after the birth of the child. It would, in his opinion, be a vast improvement in obstetrics if the forceps could be substituted for ergot, as now often given during labour; and if the ergot were administered habitually at the moment of birth, or while the head was passing the vulva. Besides the prevention of hemorrhage, subinvolution of the uterus would become less frequent. This rule of giving ergot had been extensively followed, by his advice, and with the best results, in India, where flooding was still more common than in this country.—*Lancet, Dec.* 11, 1869, *p.* 806.

91.—AN AID TO PARTURITION, AND TO THE TREATMENT OF DISPLACEMENT OF THE UTERUS BY A NEW MECHANICAL APPLIANCE.

By Dr. PROTHEROE SMITH, Physician to the Hospital for Women, &c.

What makes the contrast between the easy and rapid childbirth of the savage state, and the painful and lingering process in civilised life?

In answering this inquiry, I shall endeavour to elucidate the chief reason of this obvious difference, and thence to show what gives the advantage to the savage. I shall endeavour to prove that a force, which exists in the one, and is deficient in the other, explains to a great extent the dissimilarity of the two instances. I hope then to propose a remedy for the defect, and to give my experience of its efficacy. The same question applied to uterine ailments is capable of a similar explanation, and its solution will, I venture to say, elucidate an important cause of the frequency of diseases of women in civilised life.

Man being erect, it necessary follows that the structure of the pelvis and abdominal muscles must be such as to retain the viscera in their proper position, and to make the necessary expulsive efforts, which defæcation and parturition require, with impunity.

The spinal column thrown into a series of waves, not only lessens shock from concussion, but by its lumbar curve the plane of the pelvis is rendered oblique, constituting that graceful form, which, when absent, is artificially supplied by a pad or bustle, and which is so designed as to support the abdominal viscera on the pubes, aided by the abdominal muscular walls and spine, and to retain them within the pelvis. But when the plane of the pelvis becomes horizontal by the obliteration of the lumbo-spinal

curvature, or, as it is called, the Grecian bend, the abdominal viscera tend to prolapse towards or beyond its outlet, and to displace the pelvic contents.

This lumbar curve being absent at the extremes of life, the infant is found to be straight-backed; whilst the common evidence of old age is the obliteration of the double antero-posterior curves, going on to the bowed back and drooping form of those who are well-stricken in years. But the deficiency of the natural spinal curves is more or less known in early adult life; it may be from disease of the bodies of the vertebræ, with which we have at present nothing to do, but its chief cause may be found to be defective muscular power, which, in its cause and effect, forms the chief subject of the present paper.

Unlike the ancients, who suspended their garments from the shoulders, the usages of modern society impose upon females, more or less from the period of birth, the habit of wearing a cincture round the waist. From this are suspended all the clothes, which, by their weight, keep up considerable pressure on the thoracic, lumbar, spinal, and abdominal muscles; and this persistent pressure often leads to degeneration of the tissue of these muscles. Thus the muscles used in diaphragmatic respiration, and for fixing the chest in forced efforts of expulsion, as well as those of the spine and abdomen, are enfeebled by absorption or degeneration of muscular fibre, and so their functions are impaired. This alteration in the muscular tissue is well known to all who have witnessed the result of tight lacing in the deadhouse, in the muscular atrophy which marks such cases, and attenuates the abdominal walls. The consequent obliteration of the lumbar curve, and the levelling of the plane of the pelvis, destroy the natural lines of the female figure, and open the door to all those maladies, which result from the above-named deformity of the spinal column, and of the pelvic outlet.

Two great canals are lodged within the pelvis, viz., the alimentary and the generative. For the expulsion of the contents of the one, in the act of defæcation, there are necessarily: 1. The involuntary contractile force of the bowels; and 2. The voluntary force supplied by the spino-abdominal muscles.

In this act the direction of the pelvis is altered, so as to facilitate the passage of the fæces by means of an inclined plane, over which they are readily expelled.

In parturition, the expulsion of the child through the pelvic canal is protracted, in like manner, for lack of muscular power; and the process at times seems almost left to the unaided force of the womb. Hence this organ is overtaxed, and sometimes fails in its efforts till helped by instrumental traction.

Of the two uses now claimed for the pelvic band, the first is to supply artificially that force, which may be deteriorated by

dress, or suspended by anæsthetics; and, by so doing, to aid the overtaxed uterus by curtailing the period, and so to lessen the risks of ordinary labour; the second, to aid the treatment of uterine maladies.

I will now briefly describe the instrument, showing wherein it differs from, and in what way, I believe, it is superior to any that have hitherto been brought before the profession. The advantages of it, when used as an aid to parturition, are the following. 1. A fixed point is secured for the exercise of mechanical force by means of, as it were, an artificial skeleton, the immobility of which is secured by two pads, one sacral, the other pubic, retained in their respective places by lateral springs, which embrace the pelvis below the cristæ iliorum. 2. Then, a fixed point having been gained, attached to the sacral pad are two vertical levers, and one horizontal, the former (vertical springs) end each in a costal spring, embracing the thorax, and united by a sternal pad, so arranged as not to incommode the chest in respiration; the latter or horizontal is a powerful spring, buckled to a belt closely adjusted to the abdominal walls, and connected above to the costal springs and below to the pelvic band by elastic rings. It is thus constructed, so as to act in the manner of the abdominal muscles. During the parturient pains, this belt is readily tightened at will to assist, or supply the place of the voluntary muscular contractions, and is as readily relaxed in the intervals of pain. When required, it may be made to maintain a steady uniform pressure, as is often needed *post partum*. This force, reacting upon the sacral pad, affords to the patient that support in the lumbar region which is so much called-for during labour, and which is usually supplied by the hands of the nurse.

In the catalogue and report of instruments, published by the Obstetrical Society in 1867, there is at page 5, an ingenious contrivance of Dr. Woodward of Worcester, which seems to answer the purpose just referred to, and which he accordingly names an "Obstetrical Back-Supporter." When the power of the abdominal muscles has been impaired by the constraint of dress, or rendered deficient under the influence of anæsthetics, the instrument which I now exhibit supplies artificially a force which simulates that of the abdominal muscles, when in a normal state. In this way I have found it of the greatest value in cases of anteversion of the gravid uterus, at the period of parturition. Only a few weeks since, I quickly and easily rectified the abnormal position in a patient I have attended with four children. The ease and rapidity of birth offered a great contrast to her former labours, and the patient appeared herself to be better than on any previous occasion. Her subsequent getting up

"was satisfactory in every respect," and she has regained her strength in a manner so superior to that which has happened in her other confinements as to elicit voluntary expressions of satisfaction and surprise from herself and friends.

For the mechanical treatment of uterine ailments, this instrument acts in the following way. The pubic and sacral pads fixed by the lateral connecting springs tend by their mutual reaction to alter the plane of the pelvis, if too horizontal, to one more oblique, and therefore more natural. The costal springs and sternal pad attached to the end of the perpendicular springs, help still further to increase the lumbar pressure, to throw the sacrum backwards, and at the same time to fix the whole apparatus. From the pubic pad, and attached to it by a moveable rackwork, is a curved steel spring, which bent to the shape of the vagina, is passed into it, whilst it is made to carry at its extremity any form of pessary or support that may be required.

The advantage of an uterine support adjusted by these means, is that its *point d' appui*, being the pelvis itself, in ordinary movements of the body, it is not liable to displacement.

Without attempting here to enter into the pathology of misplacements of the womb, further than by referring to the cause already mentioned, viz., that of a too horizontal position of the pelvis, I would state that in order to rectify this, the prone position of the patient for a longer or shorter time has often been adopted by practitioners, and this mode of treatment was strongly advocated by my late friend and former colleague, Dr. Rigby. To counteract such derangements, I have made many experiments, which have at length resulted in the production of this instrument.

A standpoint is thus obtained, whereby force can be gradually applied to the lumbar region, so as to alter the position of the pelvis from the horizontal to a more oblique plane. The same advantage is thus gained by the pelvic band without the confinement and constraint of the prone position, and of many other ingenious appliances, which nevertheless are much more complicated and irksome to be borne.

The principal feature of the pelvic band is, that it forms an artificial skeleton, and so supplies all the chief *points d' appui* by which the complicated muscular system engaged in the acts of expulsion harmonise and effect their purpose; and it is one with the pelvis itself as to offer a stability and comfort that no appliance depending chiefly on abdominal, and therefore unstable pressure, can possibly afford.—*British Medical Journal, Nov.* 27, 1869, *p.* 580.

92.—OVARIOCENTESIS VAGINALIS, WITH A NEW METHOD OF PERFORMING THE OPERATION.

By Dr. E. NOEGGARATH, New York.

[The puncture of cystoid tumours of the ovary through the vagina for the purpose of effecting a radical cure, though attended with a fair average of success, has met with little favour, and is not even mentioned in most surgical treatises. They have not unfrequently been punctured, where by their protrusion into the vagina they have obstructed the progress of labour.

Kiwisch was one of the first writers who gave the operation his support. He published some successful cases in 1845.]

The description of the operative procedure which Kiwisch published in his *Klinische Vortraege über spec. Pathol. und Ther. der Krankh. des weibl. Geschlechtes*, B. II., part of which treatise has been translated by J. Clay in 1860, is given in the following words:—"In order to answer the purpose intended by us, the cyst is opened through the wall of the vagina to such an extent that a finger can be easily introduced through the wound. After evacuation has been effected, a strong, long uterine tube with a bulbous extremity is introduced into the cyst, and fastened in front of the genital organs, and left for several weeks, until diminution of the cavity of the cyst takes place, which process is accelerated by the daily injection of warm water." The further procedure in this operation was generally as follows: first of all, Kiwisch made an explorative puncture, in order to be certain that the cyst was unilocular. After it had refilled, the patient, after proper evacuation of the bladder and rectum, was placed in the position for lithotomy. An assistant undertook the compression of the cyst in the lower abdominal region; a second provided for the reception of the fluid and the fixing of the legs. By means of the uterine sound he ascertained the position of the uterus, which was invariably pushed forwards, and by exploration with the finger the condition of the rectum was determiued. Between these lay the cyst to be opened, pressing down the vaginal floor more or less deeply. The operator now placed the index-finger of the right hand on that portion of the vaginal wall where fluctuation was most distinct, or where the cyst projected most. In order to make this easier, the assistant made strong pressure upon the cyst from the abdominal region. In opening the cyst he used a long curved trocar, which was pressed with the point drawn back on the fluctuating place, and then plunged into the tumour, in the direction of the axis of the pelvis, till the canula penetrated about half an inch into the cavity of the cyst. The resistance which the tumour offered was often not inconsider-

able, because its thickest part generally lay lowermost. When the trocar was withdrawn and the canula left, the discharge of the fluid demonstrated the immediate success of the operation. Without evacuating much, Kiwisch now proceeded to the second stage of the operation—that is, to the widening of the orifice. With this intention he introduced a long metal director, expressly made for the purpose, which corresponded exactly to the curve of the canula and without a handle, through the canula as deep into the cyst as it would go. He then withdrew the canula, and guided a long, narrow, probe-pointed bistoury furnished with a strong handle, along the director into the cavity. With this the wound was enlarged in the corresponding direction sufficient to allow the forefinger to pass, which was then introduced as deep as possible into the collapsing sac, in order to ascertain the condition of the internal surface and the length of the canal formed by the wound. After withdrawing the finger he introduced a long suitably-curved uterine tube through the wound deep into the cavity, with its other end fastened with a T bandage in front of the genitals.

Immediately after the operation the patients, when laid to rest, generally felt tolerably well; but on the second or third day symptoms of inflammation of the cyst with a general and commonly severe reaction set in. During from ten to twenty days the local irritation was manifested by the discharge of ichorous fluid, and by great pain in the whole surrounding part. In favorable cases these symptoms gradually gave place to a purulent discharge, which disappeared after a course of from five to seven weeks, and then shrivelling and perfect obliteration of the cavity took place. As long as any secretion was produced in the cavity, and especially at the time of the discharge of the ichorous fluid, care was taken to guard against any re-accumulation of the contents, by the injection of lukewarm water through the uterine tube twice a day. The injections could not be given forcibly, otherwise they occasioned severe pain. Moreover, it was necessary, in some cases, to use copious vaginal injections, because the corroding discharges irritated the vaginal mucous membrane so much that sometimes a very painful croupous inflammation occurred. It is not advisable to remove the uterine tube until considerable decrease of the disease has taken place, because its reintroduction is very difficult and painful. However, it may so happen that the wound below the bulbous extremity of the tube becomes so narrow, that great difficulty is experienced in withdrawing it. During the greatest part of the treatment the patients are continually kept in bed, and placed under a careful dietetic regimen.

Dr. Kiwisch further remarks, that the advantages which this treatment presents are self-evident. As a general rule, by tap-

ping in this way a perfect evacuation of the cyst is more certain to be effected and maintained, and thus a dangerous collection of ichorous fluid prevented, and atrophy of the cavity essentially encouraged. The displacement of the place of puncture is also not so readily produced in vaginal as in abdominal tapping; and the shrivelled ovary, after the completion of the case, is found nearly in its ordinary position, when subsequent symptoms of dislocation and pathological adhesions of this organ are avoided.

Dr. West has tapped per vaginam in ovarian disease three times, and considers that the method is attended by more hazard than may be inferred from the writings of either Kiwisch or Scanzoni.

[Prof. Scanzoni of Wurzburg has performed the operation sixteen times, in the latter of which he has used the instruments devised by Dr. J. Schnetter of New York. Ten of these cases were cured, only one died.]

According to Dr. Schnetter's advice, a curved trocar is introduced through the vagina with the point drawn back, and plunged into the tumour felt through the vagina. The stilet is then withdrawn, and a knife introduced through the canula, which is an inch and a half long in the blade, and fixed upon a handle constructed according to the curve and width of the canula. The blade of the knife projects beyond the canula. The knife and the canula are now withdrawn from the wound at the same time, and the latter is now dilated to such a size by pressure on the knife that a finger can be conveniently introduced. An elastic tube, about as thick as a finger, is then inserted and bound external to the genitals.

The principal and most important merit of Dr. Schnetter, about the performance of this operation, consists not so much in the happy modification of the instruments, as in the fact that he was the first to enlarge the sphere of the operation, by applying it to cases of cysts in both ovaries, and to cysts of a multilocular nature.

[Dr. Noeggerath reports eleven very interesting cases, with minute details of the operation.]

Indications and Contra-indications.—Not all cases of ovarian cysts are in a proper condition to be treated by the operation per vaginam. Kiwisch says of his method, that it is generally applicable to moderately large simple cysts, which do not exceed the size of a large pregnant uterus, and can be reached from the vagina. Smaller cysts are obviously still more suitable to it, as soon as they can be recognised. And still further

he asserts that the operation is only practicable in those cases where the cyst can be distinctly felt through the vagina; that it is particularly difficult when the vagina is narrow, and must then be performed with very great care. If Kiwisch did not attempt to attack cysts of very large size, he was probably afraid, not so much of the immediate effects of the operation itself, as of the evil consequences of a protracted suppuration, and its drain on the system. With the improved methods of regulating and altering the amount and quality of the secretion of the cyst after the operation, we do not think that the size of the cyst can form a proper contra-indication against this method. Extensive adhesions have been present in some of our cases, and although they have retarded the collapsing of the cyst, and sometimes the free evacuation of the secretion, they are no absolute hindrance in performing the tapping per vaginam. It is probable that they undergo a process of atrophy when their principal source of nutrition has been destroyed in its vitality. Those kind of adhesions which exclude the safe performance of other operations for the radical treatment of ovarian dropsy—namely, those connecting the cyst with the lower part of the pelvis and the vagina—are very favourable for the operation in question. The condition of the cyst-walls must be taken into account when we decide about the choice of a method of operating: if we admit that a cyst with thin walls will collapse more readily, and be more easily altered in its functions, it may, on the other hand, prove a source of danger by the fact that the inflammation at first kindled up in the inner lining membrane is apt to spread over its peritoneal surface, and thus give rise to symptoms of peritoneal inflammation. In a great many cases where the operation has been performed, unmistakeable evidences of an inflammatory process on the peritoneal surface of the cyst have been observed, which when controlled, and restricted to the peritoneum within the vicinity of the cyst, must be looked upon as a very favourable coincidence, inasmuch as the exudation is apt to aid the process of healing. The lymph deposited, if not reabsorbed, will become organised, and form a cicatricial tissue, which, by its firmness, prevents a re-expansion of the cyst-wall. Thus a considerable thickness of the walls, although it renders the operation safer, as regards the life of the patient, will protract the process of healing. The density, may, however, reach such a degree that it renders the performance of the operation in the ordinary manner not only very difficult, but occasionally impossible, as it occurred in the case of Mrs. A——t. However, since I have given up operating with the trocar, I think that no cyst-wall could be thick and hard enough to oppose any attempt at perforating, if we use the knife and dissect the single layers step by step.

As regards the contents of the cyst, those containing consolidated fat, hair, or encephaloid matter must be excluded from the operation, unless their contents be liquefied by some previous process of inflammation and disintegration. Colloid cysts, even if their contents be not thoroughly fluid, can be treated in this manner, as is demonstrated by Dr. Schnetter's first case. In this instance, after the operation a very rapid liquefaction of the colloid matter took place.

Compound, secondary, and tertiary cysts, and cysts in both ovaries, have been excluded by the first operators, but can no longer be considered a contra-indication against the successful performance of this operation, since Dr. Schnetter has first of all applied the operation successfully in cases of compound cysts. It is possible, under these circumstances, either to tap the second cyst after the first one has been evacuated, and through the same puncture, in one session, or to attack the second cyst after the cure of the first has been completed. (Case of Mrs. B——g and Dr. Schnetter's case.) Everything depends on the relative position of the several cysts to each other. If one be developed on the side of the other, each may be tapped separately on successive occasions; if one be located above the other, the lower one might be punctured, the contents evacuated, and the upper one tapped at once. This latter proceeding might, however, involve some danger in case the second puncture should not happen to touch the upper cyst at a point where it starts from or is connected with the lower cyst by adhesions. Should the trocar touch the second cyst at a point where it is only in close apposition to the first cyst, it would twice perforate the peritoneum, and the opening in the lower cyst would be dislodged from the upper one after it had collapsed; decomposed fluid or gases would escape either from the upper or the lower cyst into the abdominal cavity, and give rise to the most dangerous form of peritonitis. The accident just described, namely, the passage of ichor or foul air into the abdomen, is the cause that the operation, when performed after the method of Récamier, and of late by Dr. Sims, must necessarily prove fatal. Both operated in the following manner: A curved trocar, about two feet in length, was passed into the cyst through the abdominal walls, and directed towards Douglas's cul-de-sac; a second trocar was pushed into the cyst through the vagina, so as to meet the former instrument, which is then withdrawn. Thus two openings are established in the sac, the lower one giving issue to the contents into the vagina, the upper one into the abdominal cavity, causing the accident leading to inevitable death of the patient.

It is therefore better, under all circumstances, to puncture only one cyst at a time; to allow the first one to be drained

thoroughly and to contract sufficiently; to wait for the upper one to descend into the vagina, and thus to come within reach of the instruments. In case a second operation appears to be inevitable, it would probably be better to establish the opening in the vagina and the cyst in either the right or left side of the pelvis, as near as possible to the iliac bone, in order to retain sufficient space on the other side for the performance of the second operation. The time for the second operation is, however, not always optional, since it occurs that the process of decomposition of the contents of the first cyst extends to the second by the separating septum, causing septicæmia, when a second operation is demanded in the shortest possible time, to divert the danger of hectic fever. In Dr. Schnetter's first case a second cyst spontaneously evacuated its contents by suppuration into the first one. It is probable that, by the collapse and destruction of the principal cyst, an obliteration of the vessels feeding the smaller cysts takes place, in consequence of which they either disappear by atrophy or cease to grow.

The relative position of the cyst to the uterus and the neighbouring organs is of the greatest importance. The operation can only be performed in those cases where the cyst is distinctly felt through the vagina behind the neck of the uterus. This was considered necessary in all cases where the operation of tapping per vaginam was to be performed. I have, however, succeeded in executing this method in a case (V——t), where the womb was turned backward and the cyst located in front of it. The uterus, in this instance, was placed forward by the sound, and the cyst pressed downward into Douglas's cul-de-sac. Under similar conditions, where it should be found impossible to accomplish this manœuvre, I would propose to tap the cyst through the abdominal wall, and try to bring it in proper position for the performance of the operation before it had been filled up to its full size.

With regard to the constitution of the patient, experience has taught, that women reduced to a very low degree of health and strength, may be safely subjected to this method of operating, because our better means of performing the operation, and the improved method of after-treatment, do no longer exclude any constitution, no matter how much impaired by previous disease.

After-treatment.—The treatment after the operation has to direct its attention to two points: first, to the reaction following the opening of the peritoneum; and second, the accidents arising from the altered secretions and the inflammation of the cyst. With regard to the symptoms of the first order, it may be said that they never require any very active treatment,

except where the operation has been performed in highly irritable and exhausted patients. But even under such circumstances the local application of ice and the use of morphia is always sufficient to rapidly subdue reactive fever and threatening peritonitis. Under ordinary conditions, the reaction on the general system is but slight during the first few days, and it is not until the fourth or fifth day that severe symptoms set in. This second stage of reaction comprises different sources of danger, which must be well understood in order to be properly attended to. They may either be owing to inflammation of the cyst and its peritoneal lining, or to absorption of decomposed matter. In the former instance, the ordinary rules for the treatment of inflammation of serous membranes hold good. A certain degree of inflammation of the cyst and its surrounding tissues, especially of its lower aspect, is always observed, and necessary to bring about adhesion between the peritoneal surface of the cyst and that of the vagina. It is further necessary to destroy the vessels contained within its walls. Wherever the operation is performed according to the method usually employed, namely, by keeping a catheter or canula inside the cyst, inflammatory action is more apt to occur, from the fact that that part of the cyst-wall, opposite to the puncture, is occasionally brought in contact with the upper edge of the canula, by which it is unduly irritated—a fact which I have observed in one or two instances, and where I removed pain and other signs of inflammation by altering the position of the instrument. The septic fever must be avoided by procuring the most com plete evacuation of the contents of the cyst, and by altering the character of the secretion. Both indications are complied with by the use of cleansing and disinfecting injections. The frequency of these injections as well as the strength of the disinfecting solution, must be proportionate to the amount and character of the discharge.

In summing up the result of operations performed in 48 cases, we arrive at the following conclusions:

Of the 55 operations performed, 34 were successful; the disease returned in 3; result left undecided in 4; death occurred in 14 cases, or $25\frac{5}{11}$ per cent. Among the latter 5 may be considered as the direct and immediate effect of the operation, viz.: 1 in consequence of hemorrhage, 4 from peritonitis.

Death was caused in 7 cases by septicæmia and secondary peritonitis.

One patient died from typhoid fever; one from an attack of peritonitis not caused by the operation itself.

With our improved method of operating and after-treatment, we expect that the death-rate can be reduced to a minimum; hemorrhage to any considerable extent can be avoided, and the

most prolific source of danger, septicæmia, so influenced by topical applications to the secreting surface of the opened cyst, that we are confident the operation will take the place of ovariotomy in all those cases, of either simple or compound cysts, where the tumour can be attacked through the posterior vaginal cul-de-sac, either primarily or after artificial forward dislocation of the uterus.—*American Journal of Obstetrics, May* 1869, *p.* 1.

93.—ON TAPPING IN OVARIOTOMY.

By T. SPENCER WELLS, Esq., Surgeon in Ordinary to Her Majesty's Household, and Surgeon to the Samaritan Hospital.

[Professional opinion has to some extent been unsettled as to the propriety of ever tapping ovarian cysts. One German author, for instance, has lately gone so far as to say "no surgeon should ever puncture an ovarian cyst. Tapping is a crime." The chief grounds of objection to it have been the temporary nature of the relief, and the liability to produce adhesions.]

In order to weigh the value of these objections to tapping, I have gone over the records of the 300 cases of completed ovariotomy, and have arranged in the following table the cases where tapping had never been practised, and where it had been performed from one to sixteen times.

	Cases.	Recoveries.	Deaths.	Mortality per cent.
Never tapped	135	98	37	27·40
Once tapped	78	58	20	25·64
Twice tapped	36	24	12	33·33
Three times tapped	19	14	5	26·32
Four "	9	6	3	
Five "	3	2	1	
Six "	5	2	3	
Seven "	2	2	...	
Eight "	4	3	1	33·33
Nine "	3	2	1	
Ten "	2	2	...	
Eleven "	1	...	1	
Fifteen "	1	1	...	
Sixteen "	2	1	1	
	300	215	85	

It may be seen that the general mortality of the 300 cases is 28·33 per cent.—and that 135 patients, or nearly one-half, had never been tapped. In them the mortality is 27·40 per cent., not 1 per cent. less than the general mortality. In other words, the mere fact that a patient has or has not been tapped

(so far as can be judged from 300 cases in the hands of the same operator) does not affect the result of the operation by so much as 1 per cent. Indeed the mortality of the patients not tapped, though less by about 5 per cent. than that of the patients who had been tapped twice, is greater than that of the patients who had been tapped once and three times. Thus 78—or rather more than a fourth—had been tapped once, and the mortality was 25·64 per cent. Of nineteen who were tapped three times, the mortality was 26·32 per cent, Of the 36 who were tapped twice, the mortality was exactly the same as that of the group of cases tapped from 4 to 16 times, namely, 33·33 per cent.—or 1 in 3.

It may be taken then as almost certain that the mortality of ovariotomy is but little affected by tapping—that the fact of a patient not having been tapped, or having been tapped very often, is by itself of little or no value in prognosis. I have shown in a former paper that such adhesions as are apt to follow tapping have no appreciable effect upon the mortality after ovariotomy; and I can now add that in some of the patients who had been tapped most frequently there were no adhesions, and there were firm adhesions in some who had never been tapped.

In considering the objection to tapping on the ground of its danger, as compared with the danger of ovariotomy, some writers appear to me to have fallen into great error. They take a certain number of cases of ovarian disease, and say that so many patients died after one tapping, so many after five, six, or ten, and conclude that tapping is a very fatal operation. I have heard it gravely asserted that it is a more fatal operation than ovariotomy, because after ovariotomy, a third or more of the patients recover; while, after tapping, sooner or later, they all die. But the very important distinction is overlooked between an operation which either cures or kills, and one which only fails to save life, or kills only under most exceptional circumstances.

It is seldom that a surgeon is called upon to perform ovariotomy in order to save a patient from imminent death. But this does occasionally happen. Dr. Wiltshire and Dr. Watson have published a case, where a woman who was dying from bleeding into an ovarian cyst, was saved by immediate ovariotomy. I have been sent for twice to operate under similar circumstances, but both patients were dead before I arrived. In both, large veins had burst, and some pounds of blood were found inside ovarian cysts. If, in any of these cases, the death of the patient had followed ovariotomy, it could hardly be said that this operation had killed the patient; it had only failed to save life. So, if a patient be near death, poisoned by an ovarian tumour in a state of gangrene from a twist in the pedicle, or by the

fetid contents of a suppurating cyst, ovariotomy, if performed unsuccessfully, can only be said to fail in saving life. It cannot be said to kill. Yet I have operated successfully under such desperate circumstances; and more than once when rupture of a cyst into the peritoneal cavity had been followed by diffuse peritonitis. In any such case, ovariotomy must be compared with trephining, tracheotomy, herniotomy, or the ligature of some large artery in a case of wound or burst aneurism, or primary amputation of a limb in compound fracture. It is not the operation which is the cause of death, but the disease or accident from the effects of which the patient is not saved by the operation.

But such cases as those just alluded to must be very rare exceptions to the large majority in which ovariotomy becomes the subject of consultation. There is generally as much time for discussion as in the parallel case of lithotomy in the male adult. And in both cases, the responsibility of operating with the full knowledge that if the patient be not saved by the operation he or she is killed by it, must be fairly faced. It is true that death would almost always be caused by the stone or the ovarian tumour, but it might be at a distant period, and if death follow the operation in a few days, the operation must be almost always the cause of death.

Tapping stands on a totally different ground. As a rule, when a patient dies after tapping, it is not because tapping has hastened her death, but simply has not succeeded in saving her life. Her life may have been prolonged by repeated tappings, but at last she dies worn out by the disease.

In a future paper I hope to bring before the Society the results of tapping in cases where ovariotomy has not been performed. At present I must limit these remarks to the relation which one operation bears to the other, and I think I have already brought forward a sufficient number of facts to warrant the acceptance of the following propositions.

1. That one or many tappings do not increase considerably the mortality of ovariotomy.

2. That tapping may often be a useful prelude to ovariotomy, either as a means of gaining time for a patient's general health to recover, or of lessening shock by removing the fluid a few hours or days before removing the solid portion of an ovarian cyst; and

3. That when the syphon-trochar, which I brought before the Society in 1860, is carefully used, in such a manner as to prevent the escape of ovarian fluid into the peritoneal cavity, and the entrance of air into the cyst, the danger of tapping is extremely small.—*Medico-Chirurgical Transactions, Vol.* lii, 1870, *p.* 205.

94.—FOUR CASES OF POLYPUS UTERI.

Under the care of Dr. LLOYD ROBERTS, at St. Mary's Hospital, Manchester.

Case 1. *Cellular polypus attached to the posterior lip of the uterus; flooding three years; excision; recovery.*—E. T., aged 43, was admitted on June 1st, 1869. She has been married twenty-three years, and has had nine children born alive and twelve miscarriages. The catamenia commenced at fourteen, and continued up to the period of her last miscarriage, three years ago, when a flooding began, which has continued at intervals ever since.

Present state.—She is blanched, feeble, and anæmic, with a small, weak, and frequent pulse. A specular examination revealed a cellular polypus, about the size of a vetch, concealed within the os uteri, and attached to its posterior lip, which was insensible, and bleeding freely. In fact, flooding had been going on for several days. She complained of lumbar and hypogastric pains, and loss of appetite.

June 5th, 1869. The speculum having been introduced, the polypus was seized by a small vulsellum, drawn forwards, and detached by means of a pair of curved scissors. A small plug of cotton-wool was then applied, and the vagina subsequently washed daily for a few days. No further hemorrhage occurred, and she was discharged cured on June 17th, 1869. Menstruation has since taken place, and her recovery continues perfect.

Case 2. *Fibro-cellular polypus of the uterus, the size of an orange; flooding three or four years; excision; cure.*—R. R., aged 49, married ten years, has had one child, admitted July 20th, 1869. Her menstruation commenced at fourteen and has always been regular. No leucorrhœa. She has had flooding three or four years, at first every fortnight, lately much oftener: to this very little importance was at first attached by the patient. In the intervals a copious, purulent, and fetid discharge takes place. Lately she has suffered much pain in the bottom of her back, in her loins, and down her thighs, with a painful straining sensation when at stool. Dr. Roberts made a digital examination, and encountered a round body of the size of an orange, rather soft in consistence, lying in the vagina, and extending into the neck of the uterus, being, in fact, a polypus with a pedicle as thick as a two-shilling piece. The open orifice of the os uteri readily admitted the point of the finger, which could thus be passed upwards to the insertion of the pedicle, which was posterior, and into the lower segment of the uterus. The lower and depending portion of the growth was studded with superficial ulcerations. There was much ema-

ciation, with sallow and very pale countenance, clean and moist tongue, frequent and feeble pulse, and difficult breathing.

On July 27th she was brought for operation. The vagina having been dilated by means of a Sims' speculum, and the polypus brought into view, it was seized with a vulsellum forceps, and drawn by firm and continuous traction to the external aperture; the pedicle was then divided as closely as possible to its insertion. No bleeding whatever occurred either during or after the operation. The vagina was syringed daily for a week, and she made a good and rapid recovery.

Case 3. *Large fibro-cellular polypus of the uterus; flooding for two years; excision; successful result.*—E. R., aged 48, a tall, muscular woman, from Mottram, in Cheshire, was admitted on August 2nd, 1869. She has been married twenty-seven years, has had five pregnancies—one child living, another still-born, and three miscarriages. Menstruation commenced favourably when she was twelve years old, and was always profuse. She was not subject to leucorrhœa. Two years ago she commenced flooding, which has continued almost uinterruptedly ever since, so that she is seldom entirely free from discharge, which, when not bloody, is either green or colourless. She is often attacked with severe pains, which, she says, resemble labour pains.

Present state.—She has short and hurried breathing, palpitation, and most of the symptoms indicative of anæmia, small, weak, and frequent pulse, œdematous legs, pain in the back, loins, and fore part of the thighs. On a vaginal examination there was found a large smooth polypus, the size of the two closed fists, attached by a large pedicle to the lower segment of the uterus posteriorly, and hanging through the patulous os into the vagina. There was much discharge of blood during the examination.

Operation, August 12th, 1867. Chloroform having been administered by Mr. Runcorn, Dr. Roberts, after dilating the vagina with Sims' dilator, seized the tumour by hooks, and with steady and firm traction dragged the polypus downwards, and divided the pedicle with a pair of curved scissors. No hemorrhage resulted. The vagina was syringed in the usual way for a few days, and she was discharged, cured, on September 1st, 1869. Menstruation has occurred twice normally since she left the hospital.

Case 4. *Large lobulated fibroid polypus of the uterus, weighing* 24½ *ounces; écrasement; extraction by means of midwifery forceps; recovery.*—(This case is reported by Dr. Leonard.)—D. H., aged 35, from Newcastle-under-Lyne, was admitted on August 24th, 1869. She began to menstruate at the age of twelve years, always regularly, the discharge lasting six or seven days. She has had two children born alive, and has never miscarried.

She has also been subject to slight leucorrhœa. She has had menorrhagia, and irregular metrorrhagia, for five years, which discharges were supplemented later on by a muco-purulent leucorrhœa of offensive odour. She has had sacral and lumbar pains, and frequently cramp, especially in the right leg, with constant intra-pelvic pains. Being unable to evacuate the bladder, a frequent use of the catheter was necessary. Walking was performed with great difficulty, and very much pain, particularly in the right leg. She has had frequent attacks of flooding lately.

Present state.—She is sallow, haggard, and pale, with the small, weak, and frequent pulse of debility. There is dyspepsia and loss of appetite. A vaginal examination was made, and the pelvis was found to be filled with a large tumour, lobulated, smooth, insensible, and of very firm consistence. It was with great difficulty that the finger could be passed upwards, and the os uteri felt; but this being accomplished, a pedicle, evidently about the thickness of an apple, was felt extending through the os into the uterus.

August 26th. The polypus was dragged, by means of hooks and steady and firm traction, as near the external aperture as possible. It was then removed, by passing round it, as high as possible, the écraseur of Dr. Hicks. In the first attempt, the wire broke before it penetrated the structure of the tumour. Another wire was then introduced higher up, and nearer the uterine attachment. This rapidly worked its way through, and firm and continuous efforts were made by hooks and vulsellum to draw the tumour from the pelvis. These proved entirely ineffectual, from its great size and unresisting material; and its removal was at length effected by the application of the midwifery forceps, and the employment of very considerable extractive force. While passing the perineum the latter gave way, the tear reaching as far as the sphincter. The wound, however, afterwards healed by the first intention, by merely bandaging the legs together. She was put to bed, and the vagina syringed regularly for ten days. She made a rapid and safe recovery, without any flooding, and has menstruated since the operation. —*Lancet, Nov.* 20, 1869, *p.* 706.

95.—ON AN IMPROVED ELASTIC PESSARY.

By JOHN CLAY, Esq., Professor of Midwifery, Queen's College, Birmingham.

When an elastic pessary is introduced into the vagina and remains *in situ* for some time, the tube attached to the pessary for the purpose of inflating it often becomes so annoying to the

patient that a prolonged use of the instrument cannot be tolerated.

To remove this difficulty, I have succeeded in devising an instrument which can be adapted to any form of elastic pessary for the purpose of inflating it, and for removing the air when it is desired to withdraw the pessary from the vagina.

The principal feature of the instrument is a new form of valve. Its mechanism consists of a double tube forming a cylinder and piston. The pessary is introduced into the vagina in its flaccid form, and is then inflated by the force-pump, which is connected with the valve by a screw. The piston-rod is then pushed in flush, and the force-pump unscrewed. When the pessary is required to be removed, it is held firmly by two cat-gut strings of convenient length, at the same time that the piston is drawn forward by the string. The air will then escape, and the pessary collapse, when it may readily be withdrawn from the vagina.

The working out of the suggestion seemed at one time to be a mechanical impossibility; but, owing to the skill and attention of Messrs. Salt and Son, of this town, an instrument has been perfected as simple in its construction as it is efficient in its application.—*Lancet, Jan.* 1, 1870, *p.* 7.

96.—NOTES OF A CASE OF RIGID OS TREATED BY HYDROCHLORATE OF APOMORPHIA.

By Dr. MILNE.

(Read before the Obstetrical Society of Edinburgh.)

In June last I was called to attend Mrs. S., Melville Terrace, in labour with her fourth child. On arrival I found she had been suffering for three or four hours, and the pains were pretty strong. The os was about the size of a sixpence, and rather hard. The head was below the brim. Previous labours natural and easy. Two hours after, on making a second examination, I was rather astonished to find that, despite pains of a second stage character, little, if any, progress had been made. I introduced my finger within the os, and describing its circumference rather firmly, I found it intensely firm and resistant. I then placed the patient under the influence of chloroform, and commenced to dilate cautiously with the finger. Little good, however, was done by these means, for at the end of eight hours the os still remained about the same size. I then procured a little tartarated antimony, giving two grains in two hours. This, though producing vomiting and ample nausea, secured neither the softening nor the expansion of the os. As the pains were continuing rather strongly, I administered 25 minims of liq. morph. hydrochlor.,

and left for some time. On returning three hours afterwards, I found that matters were still much the same, the morphia neither having moderated the pains nor helped to reduce the induration of the os. Having brought with me a little hydrochlorate of apomorphia, I resolved on giving it a trial, being aware of its power as an emetic. A solution containing gr. $\frac{1}{4}$ was given. In about ten minutes the patient vomited, and the pains were subdued a little, being less frequent and forcible. On examining again, to my delight the os had softened and expanded immensely, a single sweep of the finger serving to complete it. The pains redoubled their force, and, in a few minutes more, delivery was accomplished.

Remarks.—Cases of rigid and unyielding os are familiar to most obstetricians who have seen much practice, and there are few of us but have spent many weary hours over instances of this kind. I would, therefore, not have thought of reporting it but for the fact that I obtained such efficient aid from a new drug, and that probably we have got a novel uterine relaxant of considerable power. I say probably, because a single case can no more test a remedy—establish a rule—than a few green leaves can make a summer. It is true that the very rigid os relaxed in a twinkling almost after the apomorphia had time to act, as if the one were cause and the other effect; but then the other relaxants may have helped to pave the way, and the growing exhaustion of the patient may also have pioneered. Further trial is therefore requisite before we can laureate it much, and this I intend giving it as opportunity offers. If it should maintain its character as a uterine relaxant—the antipodes of ergot—and effectually throw open the door of the uterus in extreme cases, I need hardly say that we shall have obtained a drug of unspeakable value; for a fundus and body contracting powerfully, and an os refusing to expand, is about one of the most distressing complications in midwifery. It is a house divided against itself, a perilous antagonism, and has been fruitful of such deplorable results as inflammation, rupture of the uterus, convulsions, exhaustion and death. For myself, there are many other complications that I would prefer before it. The medicines that I employed prior to the apomorphia are those commonly used, and in general prove effectual; the chloroform and antimony, with a little fingering, proving a good tripod on which to rest in these cases. Here they were ineffectual. I may state that I have long since abandoned belladonna, from a conviction, that however infallibly it may dilate the sphincter of the eye, it is next to useless here. I have never bled in such cases, believing that the remedy is worse than the disease,—that is to say, while you may secure in some cases the solution of the rigidity, you do it at a very great ransom, you enfeeble a patient already

weak, and the subject of other causes and sources of debility. Incising the os is a line of treatment I have only once had occasion to adopt, viz., in case of a cancer; and although it is supported by great names, and warranted by considerable success, yet we have always the feeling that the incisions may go further than we desiderate, and that the patient may, in consequence, fare all the worse. Of course there will always cast up, now and then, cases beyond the power of medicine, and amenable only to the scissors or knife; but wherever medicaments can accomplish the work they ought to be employed because less beset with danger.

I do not know that we can hope for much benefit from the apomorphia in cases of undeveloped os and cervix, such as in some cases of placenta prævia; at all events it ought to have a trial. Being also a sedative, it may in some instances lay an arrestment on the pains, the presence of which, until the os be dilated, is a source of peril. If it fulfil the twofold function of opening up the os uteri, and laying for a time an embargo on the uterine contractions, it will solve a difficult problem in this complication, and confer inestimable good.

In reference to the mode of administration of this drug, I may remark that it is much more powerful when injected into the cellular tissue. Were the stomach in any case, therefore, rejecting most things, it could be given by means of Wood's syringe. —*Edinburgh Medical Journal, Jan.* 1870, *p.* 659.

97.—ON POINTS TO BE OBSERVED IN OVARIOTOMY.

By Dr. D. Lloyd Roberts, Physician to St. Mary's Hospital, Manchester.

[Every available precaution should be taken to avoid an unhealthy atmosphere in the room used for ovariotomy. The ward should be light, airy, lofty, free from draughts, and the walls painted to admit of frequent washings.]

The *operating-table* should be opposite and near a window. The patient should be well and completely covered with flannel for warmth, and only the abdomen and face exposed. The bed, thoroughly warmed to receive the patient, should be at hand; and she should be lifted into it with the utmost care, as the slightest concussion is liable to bring on vomiting.

Temperature of the room.—The high temperature advocated by the earlier operators is wholly unnecessary, and even injurious, as it increases the risk of chloroform accidents. A temperature of 64° I have found most favourable.

Anæsthetics.—I have invariably used chloroform. From its tendency to excite vomiting, which is a very formidable com-

plication in all abdominal sections, it is doubly important that the patient should be brought and maintained under its influence by as small a quantity as possible. This is the primary object to be kept in view; and, whatever be the apparatus used, careful and experienced administration is essential. Mr. Spencer Wells informs me that he has used methylene in preference to chloroform for the last two years. Dr. Keith has employed sulphuric ether, and the very little vomiting which resulted, added to the success of his operations, appear to constitute a strong recommendation in favour of that anæsthetic.

Incision.—Considerable difference of opinion existed among the earlier operators upon this point. It may now be regarded as established, that the extent of the incision should be determined, not only by the size, but also by the nature and consistence of the tumour, the small incision being first practised and enlarged according to the necessity of the case. When the contents of the tumour are fluid, they can be easily drawn off by the canula, the cyst, thus diminished in size, following by the slightest traction through a comparatively small incision. On the other hand, if the tumour is solid and does not admit of reduction, it is better to enlarge the incision than violently to drag a solid, unresisting mass through an opening wholly inadequate for the purpose. The extent to which compound cystic tumours may be reduced by the method adopted by Mr. Wells in emptying one cyst through another by the trocar, is surprising. In making the superficial incision, it is well to avoid opening the peritoneum until quite sure there are no bleeding vessels; which, if discovered, should be twisted or tied. The incision should be made down to the peritoneum without a director. This membrane can then be pinched with the forceps, the fold thus produced divided with the knife, and the director inserted. The membrane can then be divided upon it, above and below, till the incision is coextensive with that in the abdominal wall. This first incision may reach to two inches above the pubes.

Adhesions.—Before tapping cyst the hand should be passed through the incision and over the tumour to ascertain if there be any adhesions. If so they may be separated by the hand, by the handle of the scalpel, or even by dissection. Adhesions to the bladder, liver, intestines, omentum, and abdominal parietes are dangerous in the order enumerated. The separation of adhesions to the liver, intestines, or bladder is better effected by careful dissection, great care being necessary in order to avoid denuding the viscus of its peritoneal coat or perforating the intestine. Bleeding vessels are best treated by actual cautery or by ligature, cutting the ends close, the latter being the safest practice.

Pedicle.—There are now various methods of treating the pedicle—viz., by clamp, ligature, actual cautery, écraseur, pocketing the pedicle (Storer), and the seroso-plastic method (Maslowsky), each possessing peculiar advantages according to the nature of the case. When the pedicle is sufficiently long, and not very broad, and can be brought externally without undue traction on the uterus, the clamp, as first used by Mr. Hutchinson, and afterwards more extensively by Mr. Spencer Wells, offers the best method of treatment, as all suppuration into the abdomen and pelvis is avoided, and the risk of septicæmia, &c. diminished. The ligature is applicable in all cases, whether the pedicle be long or short. The practice, however, of tying the pedicle, bringing the ends of the ligature externally, and allowing it to slough its way through, is not only tedious, but involves the risk of pyæmia, pelvic and peritoneal mischief. To obviate these inconveniences, Dr. Tyler Smith has revived the bold and ingenious practice of ligaturing the pedicle, cutting the ends close, returning it into the abdomen and closing the wound, and this treatment has been most successful in his hands. Those who advocate the use of the cautery do so on the supposition that the ligature, if returned into the abdomen, may prove a source of irritation, and this plan has also proved very successful in the practice of Mr. Brown, Sköldberg, and others. It is most applicable in short, thick pedicles, where there is little adipose tissue and the vessels are of small calibre.

Cleansing the abdominal cavity.—This should be done with sponges, which ought to be of moderate size, warm, soft, and perfectly clean. The viscera should be disturbed as little as possible, but it is very desirable that all clots and fluid matter should be removed.

Bringing of wound together.—This may be done by means of pins, silk, or silver wire; the latter, in my opinion, being the most preferable, as it keeps the parts in better apposition, produces less irritation, and, if necessary, can be kept longer in than pins or silk. The peritoneum should be included in the ligatures, and there should be three sutures to an inch of surface.

Dressing the wound.—The wound should be still further supported with crossings of plaster, over which a layer of cotton wool may be placed. There is no necessity for a bandage as a support, as it produces in many cases a good deal of discomfort, is very apt to become displaced, and prevents a ready examination of the wound.

The *after-treatment* may be conducted on general principles. The patient should have as little food as possible for the first forty-eight hours, so as to obviate the tendency to sickness or vomiting. The food should be of a fluid and bland character, such as toast-water, milk-and-water, &c., in small quantities

and at divided intervals. Pain, restlessness, and vomiting are best controlled by opium given by the rectum in moderate doses. If the patient goes on well for three or four days, she may be allowed a little light food, such as chicken-broth, beef-tea, sago pudding, and good coffee, with milk and dry toast; a little champagne or good sherry with water may also be allowed. The bowels should be relieved about the fifth day by enema, which after this may be used every other day. The periodical use of the catheter should be enjoined every four hours the first few days after operation. The ligatures may be removed about the fifth or sixth day. A patient who has undergone this operation should be provided with a day and night nurse, and in hospitals they should have nothing to do with the dressing of other cases.—*Lancet, Feb. 5*, 1870, *p.* 190.

98.—ON THE TREATMENT OF CHRONIC INVERSION OF THE UTERUS.

By Dr. ROBERT BARNES, Obstetric Physician and Lecturer at St. Thomas's Hospital.

[There is now evidence to warrant the dictum that ablation of the uterus is not justified in cases of chronic inversion of that organ, until reduction by elastic pressure has been steadily tried. Where elastic pressure has failed there is still another resource which stands before amputation; this method was adopted in the following case.]

Sarah C., aged 29, was admitted at St. Thomas's in November, 1868. The has had two children, the last in May, 1868. She had flooding at the time, and the placenta had to be detached from a tumour which was taken to be a polypus. This tumour was believed to be returned into the uterine cavity; and hence a confirmation of the opinion that it was really a polypus was drawn. I am inclined to think that it was the inverted uterus which was re-inverted or restored, and that the uterus became again inverted. Hemorrhage returned at the end of a month, and continued more or less, so as to induce extreme anæmia and emaciation. It was obvious that she could not hold out much longer against the increasing exhaustion. A tumour the size of a hen's egg was felt in the vagina, connected by a neck narrower than the body of the tumour to the os uteri; at one point the sound seemed to penetrate half an inch beyond the edge of the os. The tumour was not sensitive, it was taken to be a polypus, and it was determined to remove it by the wire-écraseur. The wire was applied on the 12th November. At the first gradual tightening, the patient complained of acute pain. It immediately occurred to me that I had made an error

in diagnosis, and that the wire had encircled the uterus. I removed the wire, and having passed a sound into the bladder and finger into the rectum, I turned the point of the sound backwards, when I readily felt it by the finger in the rectum just above the root of the tumour. I subsequently felt the point of the sound by a finger in the vagina carried up behind the root of the tumour, thus clearly determining that the uterus was absent from its normal place. The patient was sent back to bed; an opiate was administered, and further proceedings adjourned. No bad symptoms followed. On the 14th November I resorted to elastic pressure. A caoutchouc bag was placed in the vagina and kept distended with water. This was kept up during five days. Twice during the interval I tried to reduce, by taxis, under chloroform. At one time I thought I had made some impression upon the constricted os, but fatigue compelled me to desist. The taxis was performed by passing the left hand within the vagina, grasping the circumference of the tumour and trying to squeeze the root of it through the ring of the os, whilst the tips of the fingers of the right hand pressed down through the abdominal wall, dipped into the funnel formed by the inverted uterus and gave a counter-pressure and support to the hand inside.

This failing, and the patient being too much prostrated to justify further delay, I determined upon making one more effort to reduce the uterus by the aid of a plan which I have advocated in my lectures for the last twenty years, and which has been suggested by Huguier, Simpson, Sims, and others. This consists in incising the os uteri at two or three points of its circumference, so as to relax the constriction formed by the circular fibres of the cervix, before applying the taxis.

This I accordingly did on the 23rd November. I drew down the uterus outside the vulva by means of a sling of tape passed round its body, preferring this to seizing it by hooks or vulsella. The neck being on the stretch, I made three longitudinal incisions into it, one on each side and one behind. The incisions were about a third of an inch deep and two thirds of an inch long. I then passed the uterus back into the vagina, followed it with my hand, and proceeded to re-invert. I was surprised to find how readily the uterus went through the os, but I was not a little uneasy at feeling that the uterine tissue gave way, as if the excisions were extended by laceration. No bad symptom, however, followed, and there was but little hemorrhage. She had an opium suppository and opium by the mouth from time to time, and perfect rest was enjoined.

On the 1st December, that is eighteen days after the operation, she had three attacks of rigors with pain in the abdomen and tenderness on pressure; no vomiting.

On the 5th there was some heat of skin; the temperature was 100; pulse 110.

On the next day the pulse dropped to 100.

On the 11th the temperature was 99·5°, and the pulse remained at 100. The abdominal tenderness subsided.

On the 23rd I made the first examination; the uterus was *in situ*; the os was a transverse fissure; all seemed to be in healthy condition. Some days later I introduced the sound. By this it was ascertained that the cavity of the uterus was somewhat shorter than normal. This I had observed by the finger at the time of reducing it. It was, I believe, the result of the long standing inversion.

This, I believe, is the first and only case in which the operation described has been performed.

Reflecting upon my own experience and that of others, I should now be disposed to modify the plan pursued in the case narrated above. Failing with simple elastic pressure, I should make a shallow incision on either side of the os uteri, omitting the third incision behind; then, instead of resorting immediately to taxis, I should re-apply the elastic pressure. The gradual gentle action thus obtained would be safer from the risk of laceration.

I would also insist upon the expediency of swabbing the interior of the uterus after restoration, with a solution of perchloride of iron. In recent cases especially, this application will be useful in preventing hemorrhage, in promoting contraction, and in obviating the re-occurrence of the inversion.

In conclusion I wish to submit two or three propositions bearing upon the important point of the diagnosis of inversion of the uterus from polypus. The means of distinguishing the two affections are entirely satisfactory; but inversion is so rare, and therefore so little looked for, that these means are apt to be neglected. Dubois and others relate cases in which surgeons of the greatest celebrity would have been saved from the fatal error of tying an inverted uterus for polypus, had they explored by the finger in the rectum and the sound in the bladder.

Many observers bear testimony to the fact that the sensitiveness of the inverted uterus is not to be trusted to as a diagnostic sign. In many cases no pain is complained of when the body of the uterus is handled. But the case is very different when compression is applied to the neck of the tumour. The round ligament, the Fallopian tubes, perhaps the ovaries, are compressed, and agony inducing prostration is the immediate result. This is truly diagnostic; and it may perhaps be turned to account without the dangerous test of the ligature by squeezing the neck between the finger and thumb.

Even where the diagnosis of polypus is made clear beyond doubt, it is possible that the ligature may seize a portion of the uterus beyond the stalk of the tumour. Gooch especially warns against this risk, and relates cases in point. Desault, Denman, and others give similar examples.

2. Before ligaturing a presumed polypus, if the sound cannot be passed two inches or more beyond the os uteri, where it embraces the stalk of the tumour, the sound should be passed into the bladder, and its point felt for by a finger in the rectum above the tumour.

3. Never induce anæsthesia for the removal of a polypus. If the ligature be tightened round a polypus it gives no pain; if it be tightened round the uterus the pain produced gives warning and the opportunity of retrieving error.—*Medico-Chirurgical Transactions, Vol.* lii, 1869, *p.* 191,

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99.—REMARKS ON PELVIC PERITONITIS AND PELVIC CELLULITIS, WITH ILLUSTRATIVE CASES.

By Dr. LAUCHLAN AITKEN.

[It is comparatively recently that the pathology of pelvic inflammation has been completely elucidated. It has come to be recognised that many of those cases which had been regarded as purely extra-peritoneal are in reality affections of the serous membrane itself. There are, in fact, two separate and distinct diseases, viz., peritoneal, and extra-peritoneal inflammation.]

Margaret H., aged 39, married, and has had four children, was admitted into the Royal Infirmary, Edinburgh, on 6th March, 1869, on account of hemorrhage after an abortion, which had occurred four weeks previously. For purposes of diagnosis the os and cervix were dilated by sponge-tents, and after examination the ergot of rye was given in drachm doses of the liquid extract, thrice daily. The bleeding ceased, and she was about to leave the hospital on 25th March, when she was seized with a rigor after lying in her bed with the adjacent window open. The pulse and temperature rose very considerably. She perspired profusely after the shivering, and became delirious. She also complained of pain above the pubes. The next day, on vaginal examination, there was fulness and tenderness in the retro-uterine cul-de-sac, but nothing more. Ordered opium internally, and poulticing. On the 29th the pain was not quite so severe, and was relieved by her drawing up her knees, and thus removing the tension of the abdominal walls from a slightly tympanitic abdomen. Immediately above the pubes a somewhat hard and very tender swelling was felt, but its limits could not be made out on account of the pain. Vaginal

examination proved the existence of a swelling in the posterior cul-de-sac pressing the uterus forward against the pubes, and, by combined internal and external palpation, it was found to be part of the same swelling felt above the pubes. The pulse was 120 per minute. She was perspiring very much, but complained less of the pain.

On the 5th April the swelling seemed softer, and apparently indented slightly on pressure. An exploring needle was introduced, and as pus escaped through it, a tenotomy knife was at once employed to make an incision in the most prominent part of the swelling. The cut was immediately behind the cervix, was nearly an inch in length, and through it there escaped very freely about a pint and a half of very fœtid pus. On introducing my finger through the opening, I felt what I considered to be the peritoneal recto-vaginal fold below. The swelling above the pubes still to be felt, but neither so large nor so sensitive.

[This patient was dismissed well on May 1, with the wound quite healed and no discharge.]

This was a highly characteristic case of adhesive pelvic peritonitis following abortion, and ending in abscess. The rapid onset of acute pain, the high degree of inflammatory fever, and the great prostration of the patient from the beginning of the attack, seemed to point to more serious mischief than simple inflammation of the pelvic cellular tissue. Still, many of the symptoms we are accustomed to find in other cases of pelvic peritonitis were wanting in this patient. As in all peritoneal affections, we often have from the commencement of the attack distressing nausea and vomiting, in consequence of which the pulse soon becomes small and quick. Dysuria, occasionally amounting to strangury, and sometimes even leading to complete retention, is often most violent, and I have seen one or two cases in which the attacks of spasmodic pain, apparently at the internal orifice of the urethra, have been so acute as to deprive the unfortunate sufferers of all power of self-control, and to lead them to utter shriek after shriek in their agony. Tenesmus, too, is another of the most distressing of the painful symptoms present, and great pain in defæcation is almost unavoidable, from the ordinary situation of the swelling and effusion. It need scarcely be added, that all appetite is usually lost; that frequently great thirst annoys the patient, and that she lies prostrate in bed, afraid even to stir, and unable to bear the lightest pressure on the wall of the abdomen, and that sleep is but seldom obtained without the use of anodynes. If the inflammation progresses, as it sometimes does, and extends to the abdominal serous membrane, the symptoms of general peritonitis rapidly supervene, and the patients usually succumb.

If, on the other hand, the inflammation remains limited, the symptoms become those of chronic pelvic peritonitis, or change into those of intra-peritoneal pelvic abscess.

Still, I do not wish to be misunderstood, nor to lead any one to imagine, because, in a typical case like the one reported, little chance of mistake can arise, that therefore we are able in every instance to make an exact diagnosis. It is only too true, unfortunately, that, in the present state of our gynækological knowledge, we cannot point out any single pathognomonic feature to distinguish pelvic peritonitis from the closely allied pelvic cellulitis; for even though the greater gravity of the symptoms in most cases of pelvic peritonitis cannot be denied, yet it would be highly improper to rely on such a fact for our differential diagnosis. I have seen as severe pain and other symptoms of high inflammatory action in cases of pelvic cellulitis as I have in cases in which I had every reason to suppose the serous membrane alone affected; while, on the other hand, I have been frequently convinced of the existence of sero-adhesive pelvic peritonitis, without the patient presenting such symptoms as would lead us to suspect inflammation in any part of the peritoneum. No doubt, the two affections may often be present coincidently; and, in fact, I have little hesitation in saying, that I believe cases of pelvic cellulitis are very frequently accompanied by some slight peritonitis. Here is a case in point:—

Mrs. C., aged 40, from Liverpool, residing in Lauriston Place, came under my care towards the end of March, 1869. Her previous medical history was not very good. She had been married fourteen years, and a year after marriage had a child, but did not make a good recovery, and has never felt very well since. She had been treated by various medical men; had taken a good deal of medicine, especially aperient, and had occasionally improved. She came down to Edinburgh, and was found to have retroflexion of the uterus, for which a loop pessary was introduced. She went about wearing this, although it gave her great pain; and it was only at the end of eight days after its introduction that I was again called to see her. Her symptoms were not by any means marked, the pulse not being above 100, but she could not go about on account of pain referred to the sacrum. On vaginal examination, a swelling between the vagina and rectum was discovered, painful to pressure, but not yielding any sense of fluctuation to combined rectal and vaginal palpation. The uterus was high in the pelvis, not immobile, however, at this time. The cervix was pressed close to the pubes. A few days after my first visit, I found her complaining of supra-pubic pain; and, on examining this region, discovered a tender swelling, which projected slightly above the pubes. Although the swelling behind the vagina was more prominent

and nearer the anus, I managed carefully to pass a sound, and proved that this tumour was the fundus uteri. On the eighth day after the first examination, combined rectal and vaginal palpation showed the existence of fluid in the swelling, and I opened it freely with an ordinary bistoury through the posterior wall of the vagina. A good deal of pus escaped, and the tumour above the pubes at once disappeared. On passing my finger into the abscess, I found that it reached, in the cavity formed in the cellular tissue, nearly to the anus. The pus continued to flow for about a week, and a month afterwards she left Edinburgh, having made an excelleut recovery, and declaring herself to be freer from pain and uneasiness than she had been for years. Her state then, as given in my note-book, was as follows:—"No pain from deep pressure in the supra-pubic or iliac regions. Internally, uterus pretty immobile, and acutely retroflexed, but somewhat laterally towards the left sacro-iliac synchondrosis. Pain on pressing the cervix upwards, and there is still some slight ulceration of the os uteri. She eats and sleeps well, and, though weak, is able to walk about without pain. The incision is quite healed, but there is some fulness remaining in the recto-vaginal space."

The situation of the cellulitis in this patient between the rectum and vagina is by no means the most common, West, in his work on the Diseases of Women, placing only 14 out of 51 cases in this position. The most common seat of cellulitis is said to be within the folds of the broad ligaments. But even setting aside the difficulty of accurately ascertaining the exact site of those inflammatory products without a post-mortem examination, it must be remembered that Nonat, West, and M'Clintock, who give statistics or offer opinions on this subject, do not sufficiently discriminate between the intra and extra peritoneal forms of pelvic inflammation, thus rendering any assertions on the point almost valueless. For similar reasons, it must be equally apparent that we have at the present no reliable information on the subject of the comparative frequency of suppuration in the two distinct forms of inflammation in the serous membrane or cellular tissue of the pelvis. Thomas, indeed, with a boldness worthy of a better cause, roundly asserts that the marked tendency to suppuration in cellulitis, is an important point in the differential diagnosis of that affection from peritonitis; but though other authors, as Duncan, maintain that suppuration is the most common termination in cellulitis, yet no one, so far as I know, except Thomas, has ventured to draw any important inference from what is at the best a mere supposition on his part.

There can be no doubt, however, that when pus has formed in the cellular tissue, it much more frequently finds an exit for

itself externally than internally. The statistics of M'Clintock—though liable to correction on account of the fact just stated—seem to show that it is through one or other of the iliac regions that the puerperal cellular abscess most commonly discharges itself. But when M'Clintock goes on to express his concurrence with Dr. Bennett in the statement, that non-puerperal pelvic cellular abscesses are most frequently discharged through the rectum or vagina, I cannot help affirming that he offers no adequate proof for his belief. The passage, however, in M'Clintock's essay on the subject is so confused, that I am quite unable to make out whether he is really speaking of cellular abscesses only, or whether he does not include intra-peritoneal collections as well. "I have an opinion," says Duncan, "that abscesses in the cellular tissue (parametric abscesses) open more frequently externally than intra-peritoneal abscesses (perimetric abscesses) do;" and Aran seems to be much more convinced of the truth of the assertion than Duncan is. At least he states very decidedly his opinion, that intra-peritoneal abscesses almost never find an exit through the abdominal walls; and on anatomical grounds alone, we may be fully as confident of this as Aran. The fact seems to be, as Duncan has already pointed out, that the intra-peritoneal abscesses perforate the most perforable viscus; and if we reflect for a moment on the most common site of the purulent collection in those cases, it becomes evident that the rectum and sigmoid flexure are the parts of the intestines into which the matter is most likely to find its way. Very seldom, indeed, does the perforation occur through the bladder, and even more rarely through the uterus or vagina.

That suppuration is more common in the puerperal than in any other variety of pelvic inflammation—whether in the serous membrane or cellular tissue—is a fact disputed by no one; and I think it also probable, that not only is suppuration much the most common termination in such cases, but also that the matter forms much more rapidly. In one patient, in whom the peritonitis had been caused by exposure to a cold wind after an abortion, the pus was completely matured, and the abscess ready for opening on the seventh day after the existence of fulness in the retro-uterine cul-de-sac had been made out. There are one or two other events, too, which have been noticed by observers as more frequent in the puerperal form of the disease than in any other. M'Clintock, for example, calls our attention to the very insidious manner in which the attacks sometimes come on; and in reference to this makes the admirable observation, that in all cases of bad recovery from child-bed, we should carefully examine the iliac regions day by day, as he has thereby frequently been enabled to detect latent inflammation when no other symptom indicated the occurrence of morbid

action. In making this remark, he is, of course, speaking of cellulitis, the only variety of pelvic inflammatory tumour he attaches any importance to; but if we add, that in many such suspicious cases, it is absolutely necessary to have recourse to internal examination, the observation is equally valuable with reference to pelvic peritonitis. Bernutz, too, notices another danger to which the puerperal patient is much more liable than the non-puerperal, when pelvic peritonitis has been developed. "The extension of the inflammation by simple contiguity from the pelvic to the abdominal peritoneum," he observes, "is especially liable to occur in cases of puerperal pelvi-peritonitis at about the end of the second week when the patient has not taken sufficient care of herself. This happens much more frequently in hospital than in private practice." The following notes of the post-mortem examination of a patient who died in the Royal Maternity Hospital, tend to show that this observation of Bernutz is unfortunately only too often verified:—

The patient, aged 29, miscarried at the seventh month, and was delivered of a dead child, after a labour lasting nearly forty hours. She died ten days afterwards, her symptoms all along having been very obscure, and the termination sudden. At the autopsy the cause of death was found to be general peritonitis, but the important point, as bearing on our subject, was the fact that the posterior part of the pelvis was hollowed out into a large cavity, containing about a couple of pints of sero-purulent fluid, which had principally gravitated into the lower part of the retro-uterine cul-de-sac. This cavity was formed by the still enlarged uterus, ovaries, and broad ligaments in front and to the sides, by adhesions of the fundus uteri to the intestines above, and by the rectum and peritoneum behind. The adhesions were recent and easily removed, and the rectum and posterior surface of the uterus were covered by recent lymph. The internal surface of the uterus presented the ordinary appearance of a puerperal uterus. There was no endometritis and no inflammation in the mucous membrane of the right or left Fallopian tubes. The posterior surfaces of both broad ligaments were covered by lymph. The right ovary was much enlarged, being two inches in length. On its anterior surface, and close to the Fallopian tube, a small rounded orifice about the size of a fourpenny-piece was found. Its edges were smooth. On the lower border, another, but larger, rounded orifice existed. It was about the size of a shilling, and had ragged and everted edges. These two orifices communicated with each other, and the ovary between was excavated out into an irregular cavity, which, however, contained no pus.

[In the conclusion of his paper Dr. Aitken considers the diagnosis and treatment of these diseases.]

In by far the greater majority of cases of pelvic cellulitis, we find, on internal examination, that the induration or swelling is on one or other side of the uterus, and that it is only very rarely that the whole roof of the pelvis seems blocked up by the hard stony mass so common in cases of pelvic peritonitis. The tumour in most cases of cellulitis is found principally in one or other of the iliac fossæ, and apparently closely connected to the iliac bones, or, if it has not advanced so far, to the pubes; while the tumour, if felt at all through the abdominal walls in peritonitis, is usually more in the mesial line, or, if situated laterally, does not by any means seem so intimately blended with the bones. An important point in the diagnosis of pelvic cellulitis, as well as of pelvic peritonitis, is the immobility or fixation of the uterus—an immobility which, in many cases of peritonitis when it is fixed all round, may be said to be absolute, while in cellulitis it rarely if ever happens that the fixation is so complete. As the immobility arises to a great extent from the presence of adhesions uniting the womb to other organs or viscera, and not alone from the presence of what we may call a tumour in the pelvis, we can easily conceive why it should be more marked in inflammation of the serous than of the cellular tissue.

In cellulitis, the uterus is usually pushed to the opposite side of the pelvis from that occupied by the phlegmon, whereas, in some cases of peritonitis, the body and fundus of the womb are so completely lost or enveloped amidst the exudation that it is only by the use of the sound, when such a use is justifiable, that we can determine its exact position in the pelvis. There can be no doubt, too, that flexions of the uterus of one kind or another—ante, retro, or lateral flexions, according to the position of the swelling—which are common in peritonitis, occur much more rarely in cellulitis. When the swelling has risen into the abdomen, we may be partially assisted in our diagnosis, not only by observing the position of the tumour, or by having followed its mode of origin and progress, but also by calling to our assistance such aids as percussion and auscultation. Portions of the intestine so frequently enter into the composition of the intra-peritoneal tumours, that we can often obtain from them a more or less modified tympanitic note, or hear the movements of gas or fluids through the mass. I know of only one form of cellulitis that could be confounded with an intra-peritoneal tumour under those circumstances, and that is the extension of the phlegmon to the abdominal cellular tissue, the *external peritonitis* of some authors. There is one point which every gynækologist can corroborate, namely, the retraction of the thigh in cases in which the cellular tissue round the psoas and iliacus muscles is involved, and the relief of pain which this

flexion produces. I have frequently noticed, in cases of pelvic peritonitis, that the flexed position of the thigh either did not ameliorate the pain, or did so only when both knees were raised, by removing the tension of the abdominal muscles.

To go any further to attempt the separation, for instance, of the different varieties of pelvic serous, and cellular inflammation from one another, or those again from other diseases for which they might be mistaken, would lead me far beyond the scope of my present observations. I have said enough, I hope, to show that, while in a few cases the most experienced practitioner may without shame confess himself at fault, yet, in the majority, the whole of the features of the case, the *tout ensemble* of signs and symptoms, present to our minds so many points of sufficient distinctness as to enable us to form a correct diagnosis.

In the acute stage, of either of the forms of pelvic inflammation we have spoken of, it may be necessary to be so far antiphlogistic as to remove blood by leeching. Of course the amount to be taken from your patient is to be regulated by her general strength, and according to the form of inflammation and variety of the disease she is suffering from. A phlegmon will require the removal of blood to a less degree than a circumscribed peritonitis. A puerperal patient, again, will probably be seldom able to bear much additional loss of blood: the sufferer from the gonorrhœal variety is usually too much weakened by the long-continued discharge which generally precedes the outbreak of the secondary affection: and the same will, in all likelihood, be true of those in whom the local peritonitis or cellulitis is only the complication of an organic disease. In the menstrual variety, on the other hand, when the flow has been suddenly checked, and in most of the traumatic forms, leeching, even to the withdrawal of a considerable amount of blood, will not only prove useful, but may even be imperatively required. The rules and method of leeching have been dwelt on at so great length by many of the French authors, that the variety of directions given, and the number of precautions they say are necessary, might almost drive an ordinary practitioner to distraction, if he were to attempt to pay any attention to them. For my own part, I have never yet seen a case in which I thought it essential to take the blood from the cervix direct. I have, in every case I employed leeches, attained all that I desired by allowing them to fasten round the anus; and the communication between the hemorrhoidal veins and those of the uterus and its appendages, is so free that we may almost consider this to be direct leeching. My great objection to the introduction of a speculum, of such a size and shape as to be suitable for leeching, into a hot and irritable vagina, is that it must press injuriously in nearly every

case against an inflammatory mass, an immobile uterus, or a displaced and tender ovary.

But if the local detraction of blood is required more in pelvic peritonitis than in the simpler form of pelvic inflammation, the use of opiates may be said to be even still more imperatively demanded in the former. The continued and severe pain, the obstinate vomiting, and the early exhaustion of the patient in consequence of the retching and straining, force us to keep our patients as much as possible under the influence of narcotics, and the most powerful of those remedies are usually necessitated. Opium and morphia suppositories of the strength of a fourth of a grain and upwards, repeated at frequent intervals, and the subcutaneous injection of strong solutions of morphia, are generally the best forms for the administration of that valuable narcotic, as the nausea and sickness often prevent us giving anything but ice by the mouth. Other anodynes, such as cannabis Indica, conium, hyoscyamus, etc., may be used, and sometimes are required, but I must confess to having little confidence in their pain-destroying properties in such acute affections as inflammation of the pelvic peritoneum, although they may perhaps be found useful in the few cases in which you ascertain that there is a distinct idiosyncrasy on the part of your patient against the use of opium.

Besides these general and local means, we must have recourse at the commencement of all such cases to constant poulticing or stuping, and it is generally advisable to add to the poultice some soothing tincture, liniment, or oil. The French, in cases in which there is much tympanitis, recommend the application of ice-bags over the abdomen; but most English physicians declare their prepossession in favour of the older method of using heat and moisture combined, in every case of peritoneal inflammation. From mercury, in any shape or form, I have never seen any benefit accrue; but to those who are wedded to the notion that its action is necessary for the resolution of a serous inflammation, it has been suggested that the best form in which it could be given, would be that of medicated pessary or suppository. In both ways, a slight action on the gums can very soon be obtained. In the first week or ten days of the acute stage, very little good is to be had from acting on the bowels by purgatives, though occasionally you require, by means of some simple enema, thrown up through a long tube, to remove any hard or impacted fæcal masses, which, by accumulating in the sigmoid flexure or rectum, may be pressing injuriously on the tender swelling in the pelvis, and thus aggravating the sufferer's pain.

The vomiting is another of those distressing symptoms which frequently requires our interference, and, I must confess, very

often baffles all the ingenuity and skill of the medical attendant, occasionally proving even so exhausting as to destroy the patient. Small doses of dilute hydrocyanic acid, bismuth in powder or solution, oxalate of cerium, charcoal, cherry laurel, or lime water, small doses of opium, blisters to the epigastrium, the spinal ice-bag, and the constant use of ice may all be tried in rapid succession, and each successive remedy prove as futile as the one preceding. Sometimes we are obliged to abstain from giving food or medicine of any kind by the mouth, and to trust to nutritive enemata solely, though in a case of pelvic peritonitis the necessity which should induce us to do so must be dire indeed, as one of the main objects of our treatment ought to be to keep the lower bowel as quiet as possible.

When the active symptoms have subsided, and the complaint has passed into the chronic stage, the treatment will vary according to whether we have an abscess formed or not; but to enter even superficially into a discussion of either point would lead me too far.—*Edinburgh Medical Journal, April* 1870, *p.* 888.

100.—THE RECTUM IN ITS RELATIONS TO UTERINE DISEASE.

By Prof. HORATIO R. STORER, of Boston, U.S., Surgeon to the Franciscan Hospital for Women.

[The importance of diseases of the rectum in their relation to diseases of the uterus is very generally lost sight of.]

The present treatment of rectal disease, especially its surgical treatment, is capable of being very materially improved.

With reference to this last proposition, I shall endeavour in the present series of papers, to make my statement good.

Rectal Diagnosis in Women.—Let me first, however, say somewhat concerning rectal diagnosis.

Rectal diagnosis subdivides itself at once into a three-fold group: namely,

1. The diagnosis of disease strictly rectal;
2. The diagnosis of rectal disease as originating, aggravating or otherwise modifying uterine disorder; and
3. The diagnosis of rectal disease as the result of outlying pelvic or pelvi-abdominal lesion.

For every one of these groups, and in every instance, a direct digital examination is absolutely indicated. It should never, under any circumstances, be dispensed with.

1. The diagnosis of disease strictly rectal. For the examination of the rectum, as is well known, a variety of instruments have been employed. These have been, in the main, of two classes,

a. Dilators, two, or three, or many-branched, and dating back to a great antiquity; bronze instruments of the kind indicated having been found in Roman excavations; and,

b. True specula, of metal, or of silvered glass; these also being sometimes several-bladed.

The latter of the above classes is that most frequently employed at present. Of the several forms of instrument, Fergusson's is in the possession of almost every surgeon, and by every one, so far as I know, it is considered indispensable in practice.

I trust I shall not be considered an idol-breaker, or an enemy to our useful coadjutors, the instrument-makers, when I say that, for purposes of diagnosis, I have long since thrown the anal speculum aside, and this, no matter what its material or form. For examination of the rectum in men, the speculum is required; for examination of the rectum in women, this is not the case, and under some circumstances, just as obtains with the vaginal speculum in reference to uterine disorder, it is worse than useless, as tending to divert attention from more important points than those striking the eye.

Let me explain what I have said respecting the non-necessity of the anal speculum in women as compared with men.

By passing the finger into the vagina, and pressing it backward and downward over the levator ani, the rectum can be everted through its sphincter like the finger of a glove. This can ordinarily be done to a very great degree; it can always be done to a certain extent. Should the sphincter be unusually irritable, and spasmodically contracting with violence when touched from below or thus from above, it can be forcibly distended by the thumbs, and temporarily ruptured, as I am in the habit of doing in such cases; the procedure above indicated thus becoming easy. We can in this manner ascertain the presence of chancre or chancroid, the character of polypi, the extent and number of internal hemorrhoids, the position of the inner orifice in fistula, &c., with far greater certainty and alacrity than by the speculum, or can be done in the male, while the mere eversion process, provided rupture of the sphincter is not necessary, is attended by very little pain.

So far as I am aware, this suggestion of rectal eversion for diagnosis, though so simple and so effective, is an original one. It may, however, be very familiar to some of my readers, and may have been mentioned by writers. In this matter of method, every old procedure is new to many minds or has been forgotten, and every new suggestion seems but the re-discovery of something already well known. All that I can say about it is, that I have practised this measure for many years, that I have shown it to a great many physicians who have been present at my examinations and operations, and that none of

them ever saw or heard of it before. Eversion of the recto-vaginal septum through the vulval orifice by pressure from within the rectum is partially possible, and a modification of it is familiar to those accoucheurs who are accustomed to hasten a fœtal head delayed at the outlet, by a finger within the mother's anus; and to some gynecologists, who have had to remove a tight-fitting foreign body from within the vagina, or a three-winged intra-uterine pessary from within a nullipara. In the latter instances, one great advantage of this procedure has been, by the finger in the rectum, to fix the body to be removed, and to prevent its rotation during attempts at its direct grasp. The same effects have been sought, with the addition of preventing their escape upward, toward or into the sigmoid flexure, in the case of foreign bodies within the anus, by digital pressure upon the rectum from within the vagina. Mr. Clay, of Manchester, lays much stress upon this procedure, and withal urges caution, lest by thus pressing downward, the sphincter ani should be ruptured. I shall hereafter show that this is precisely what should be sought rather than avoided in such cases.

These, it will be perceived, are different procedures from the rectal eversion from above, for diagnosis, that I have described, which in practice will be found alike effectual and gratifying, and equally so, in many cases, during operative interference. Regarding rupture of the sphincter ani, where indicated, by forcible distention, I shall speak hereafter, merely premising that, to Van Buren, after Recamier, we are indebted for certain of the indications of this very valuable, and at times indispensable proceeding.

I shall now adduce from many within my experience, a single illustrative instance of the method of diagnosis that has been described.

Case 1.—A young lady, unmarried and of strumous habit, to whom I had been called in Hampden County, some four years since, was subsequently removed to Boston, and placed under my care. She had uterine disease, with reflex ovarian and vesical disturbance. The meatus and vulval orifice were fringed with irritable outgrowths which necessitated excision, and there was withal vaginismus and urethral spasm of such severe character that the finger in the one case, and the catheter in the other, could only be passed during anæsthesia. A prominent symptom was the existence of intestinal and rectal irritation, the bowels being, at times, so inactive, that on several occasions I was compelled to artificially remove large quantities of impacted fæces; and at others there was excessive and very offensive purulent diarrhœa, and this almost irrespective of medication or diet. Digital or specular examination of the rectum was as impossi-

ble without anæsthesia as that by the vagina, while after the full anæsthesia had been induced, such was the spasmodic condition of the sphincter ani, that a satisfactory examination by either of the methods indicated was still impossible. I was able to ascertain the presence of ulceration within the rectum, sufficient to account for many of the patient's symptoms, but of its extent and precise character I was still ignorant. My father saw the patient with me in consultation, with the same result. I now ruptured the sphincter ani and practised vaginal eversion of the rectum, with the effect of disclosing the whole portion of the interior of that canal which was affected by the disease, settling at once the diagnosis, and rendering the requisite local remedies as easy of application as if to the exterior of the body. This patient, I may add, had also ulceration of a limited portion of the ascending colon in the neighbourhood of the cæcum, dating from a dysentery long previous, and localised distinctly enough by a point of severe and chronic pain. From this she never got ease till I applied a strong solution of nitrate of silver through a rectal or rather colonic hollow bougie, passed through the sigmoid flexure, and until its extremity could be felt by external palpation in the right inguinal region, at the seat of pain. Temporarily relieved in this manner, the poor girl finally succumbed to her malady; in this case the uterine and other pelvic disturbances having been the result rather than the cause of the intestinal disease.

[Save for purposes of treatment, Prof. Storer has thrown aside every form of anal speculum, and is accustomed to depend upon eversion of the rectum through the anal orifice by pressure within the vagnia. Where the sphincter is unusually irritable and unyielding, its rupture by forcible dilatation facilitates the examination.]

Now, and for several years past, I am in the habit of examining the recto-vaginal wall in the descent of my finger from the *fornix vaginæ*, and before withdrawing it wholly, performing the operation of eversion, stating to the patient as I do it that it is a necessary portion of the examination. She is unable to prevent it, the act being usually accomplished before she has time to object, even if she has an inclination to do so, and the idea of thus examining the rectum is less repugnant to her fastidiousness.

Case 3.—While in Washington a few months since I was requested by a physician from one of the southern States, to visit his wife. My engagements not permitting this, the lady was summoned to Washington. I found that the case was one of sterility, associated with a condition of partial amenorrhœa. Upon learning this, I remarked before proceeding to the exam-

ination, that a galvanic intra-uterine bougie would probably effect a cure, whereupon the husband stated that I need hardly expect to be able to introduce such an instrument, as the two or three physicians of his city who had previously had charge of the lady, had been unable to pass even the smallest sound, and had concurred in pronouncing the case one of congenital uterine atrophy or of organic stricture of the cervix. Upon myself essaying the introduction of the sound, I was unable to effect it, although the uterus was but slightly displaced (backward), and not particularly indurated or enlarged. It was complained by the lady that she had sometimes suffered from hemorrhoids. Upon introducing my finger into the rectum, for I had withdrawn it from the vagina during our conversation, I found its lower margin free and but little sign of disease as far upward as the finger could readily penetrate. I then reinserted my finger into the vagina and performed rectal eversion, whereupon there sprang out from within the anus, a large polypus, nearly the size of a cherry, with a distinct pedicle, attached to a broad base, which had been concealed between the folds of mucous membrane. This polypus was attached so high that it did not entirely emerge during defæcation; it passed upward before my finger during direct digital examination, it would have done so before the entremity of an anal speculum, and it never could have thus been diagnosticated. The lady came to Boston. I removed the polypus, having ruptured the anal sphincter, and within a very short time after the operation, an ordinary sized sound passed into the cavity of the uterus, and the patient wore an intra-uterine pessary of two and one half inches in length for a few days, with the effect of increasing the catamenial discharge, and greatly benefiting the general health.

The case was thus clearly proved to be one, neither of uterine atrophy, nor of organic disease of the cervical canal, but merely one of spasmodic stricture, depending upon rectal irritation. There are some cases where the diagnosis, though more direct, is not any more easily demonstratable by the ordinary methods; as in the case I now present.

Case 4.—Some six weeks ago, a patient who has long been under my observation for a lateral version, attended with dysmenorrhœa, and resulting from a partial attack of pelvic peritonitis many years since, stated to me that for several days she had suffered from extreme pain during defæcation, and at other times there was a peculiar pricking sensation within the rectum, which had made her fear the presence of malignant disease. A careful digital examination of the rectum failed to disclose the cause of this, although I made quite firm pressure against the circumference of the canal. Upon everting the rectum from within the vagina, I at once discovered the source of the trouble,

namely, the opercular bone of some small fish, probably a smelt, which in its passage from above had become imbedded between the adjacent folds of intestine, and to my finger directly impinging upon it, had presented only its flattened surface, overlaid by mucus, and partially concealed by the folds of the membrane. The removal of the foreign body at once relieved the distress from which the patient had suffered.

The following is a similar instance.

Case 5.—Two or three weeks after the occurrence of the preceding case, and by one of those coincidences observed by every physician, a lady called upon me, complaining of similar symptoms. I laughingly said that I hoped it was not occasioned by another fish bone, everted the rectum in the way that I have described, and there lay an operculum of the same size and shape as in the former case. This patient did not recollect having eaten fish for several months. Removal here also gave immediate relief.

In the cases last related, had dependence been placed upon the ordinary methods of diagnosis, the causes of the irritation would probably have remained undiscovered, giving rise, very likely, to ulceration, and perhaps to peri-rectal abscess and fistula, with all the ails attendant thereupon. Not only, however, are we enabled by the measures to which I have now alluded, to give direct and valuable information concerning the existence, extent, and character of fluid collections and of outgrowths within the rectum, and the presence therein of foreign bodies. For certain special indications, as for instance to ascertain the direction and exact nature of fistulæ, to which I have just alluded, whether anal, perineal, or recto-labial, we are enabled to resort to still other methods of diagnosis, with greater ease and certainty than as ever before been possible.—*American Journal of Obstetrics, May and August*, 1868, *pp.* 69, 119.

101.—REDUCTION IN THE SIZE OF A LARGE TUMOUR OF THE BREAST.

RELIEF OF PAIN BY THE EXTERNAL APPLICATION OF BROMIDE OF POTASSIUM AND DILUTE ACETIC ACID.

By Dr. HENRY OSBORN, Consulting Physician to the Southampton Dispensary, &c.

Mrs. B., aged 39, mother of five children, two living. Catamenia natural from the time of weaning the last child. In March, 1869, four months after weaning the child, she began to feel severe darting pain in the left breast, and perceived, for the first time, that something was forming in the breast. Instead of consulting her medical attendant, she applied an

ointment to the breast without producing any relief. In the month of August last she had a sudden discharge of florid blood, amounting to about a teacupful, from a small orifice near the nipple, when I was consulted. On examining the breast, I found the nipple completely drawn in, but I was informed that it had always been in a similar state, and a nipple-shield had to be used for drawing the breast; but during the time of nursing the last child the milk was permitted to run out without applying the child to the breast.

There was a small cicatrix a little above the nipple having a small orifice, through which an ichorous discharge and the hemorrhage took place.

On grasping the breast, I found a tumour of considerable size, exceedingly hard, tuberculated, and attached to the deep-seated parts. The pain was lancinating, and so severe at times as to disturb her rest at night and to distress her by day. Ordered a lotion of vinegar and water, and prescribed a mixture of bromide and iodide of potassium, which relieved the pain; but as the patient complained of debility, I suspended the mixture and gave quinine. Under the tonic treatment and the suspension of the bromide internally the pain returned, when I determined to try the bromide externally, by adding it to the vinegar lotion, which had produced a little eruption of the skin, and thus rendered the possibility of the bromide being absorbed. Two drachms of bromide of potassium were mixed with six ounces of vinegar, and ordered to be applied twice a day by saturating a piece of flannel with the lotion and covering it with oil silk. On the following day my patient was comparatively free from pain, and in the space of about a fortnight the tumour appeared a little reduced in size, but this was more pronounced after the lapse of about six weeks. The patient being so free from pain, and believing, herself, that the tumour was not so large, began to improve in health and spirits, and to exert herself by the free use of her arm in all domestic duties.

No internal remedy was administered, except an aperient pill occasionally, and during a sudden attack of sciatica, when I ordered two pills of grey powder aloes, and ext. aconite, which removed the sciatica within a week.

Having watched my patient about once a week since last August, I have found a gradual diminution in the size of the tumour, the reduction beginning at the most prominent parts, where the stone or "marble-like" hardness, as the patient termed it, existed. It is necessary to state that no hemorrhage has taken place since I was first consulted, and the ichorous discharge has been arrested some months past. It is also necessary to state that I, at first, formed so serious an opinion of the case that I informed the husband that a consultation with a

surgeon was necessary, when he assured me that his wife would never submit to an operation. I therefore had no alternative but to adopt Medicine *v.* Surgery, and trusting that, by giving publicity to this case, even in its present stage, a further trial will be given of the remedy.

During the last two months I have had another opportunity of trying the bromide in a case of tumour of the breast, pronounced to be cancer by two physicians, and the woman having lost her mother from cancer, tends to confirm their opinion. In this case I ordered a lotion composed of one ounce of acetic acid (B.P.), two drachms of bromide of potassium, and five ounces of water. This lotion was ordered to be diluted if found to irritate the skin too much; but the patient informed me that the pain, which was so severe, was relieved by using the lotion without its being diluted. I should have stated that it is necessary to use the lotion warm, especially during the winter.

Although only two months have elapsed since the first application of the remedy, I am enabled to state that the tumour is considerably reduced in size, and the patient suffers less inconvenience, &c.

In conclusion, I would suggest that the bromide lotion would be worth a trial in cases of orchitis, acute or chronic, and diluted accordingly.—*Medical Times and Gazette, April* 16, 1870, *p.* 412.

102.—NOTES ON ANOINTING IN INFANTILE DISORDERS.

By Dr. H. GUARD KNAGGS, F.L.S., Kentish Town.

During the past eleven months I have been testing, with uniformly successful results, the value of a very simple method of treating such infantile complaints as atrophy, bronchitis, convulsions, diarrhœa, febrile disturbances generally, and indeed all disorders of childhood which are accompanied by an unnatural state of the skin.

The treatment simply consists in smearing with salad oil the whole surface of the body, from the crown of the head to the tips of the fingers and toes, the process being repeated every twelve, six, or even four hours, according to the urgency of the case. Of course the use of a long flannel gown or small blanket is obvious, and the fluid should be slightly warmed.

The application of oil possesses the following immense advantages over the ordinary warm bath:—

1. Skin-action is more completely and permanently restored.
2. The danger of reaction is avoided, for there is no sudden change of temperature; and, moreover, the sheet of oil protects the surface from atmospheric influences.

3. It acts as a fuel-food, not only preventing waste of tissue, but actually increasing the bulk of the little patient.

4. It does not depress, but, on the contrary, appears to exhilarate.

It will scarcely be credited by many that the formidable affections above mentioned will frequently yield to this treatment, or at any rate show signs of abatement in from twenty minutes to four-and-twenty hours; but such is the case; though sometimes forty-eight or even seventy-two hours will elapse before any decided signs of improvement occur. By way of illustration, here are a few examples out of many, and I shall be happy to satisfy any gentleman as to their genuineness:—

Atrophy.—My cousin, Mr. S. H. Knaggs, was called to see an infant, whom he found apparently *in articulo mortis*. The mother informed him that she had sent for him "for satisfaction only." The child was oiled, and in twenty minutes began to look about it and took its food. In the course of a fortnight it recovered its ordinary health and strength.

Several similar cases have come under my notice. One of them is rather amusing. A brother practitioner himself told me of, and gave me permission to publish, the following conversation which took place between him and a parish patient:—"Whose child is that?" "Why, mine, sir." "But surely not the child that I told you a week or two ago you would never rear?" "It is though, sir." "Then the medicine seems to have set it to rights." "But it has had none of the medicine." "Then what have you been doing with the child?" "Why, sir, don't you recollect you told me that a friend of yours recommended that sick children should be rubbed all over with salad oil, and that I might try it if I liked, but that you had no faith in it? Well, sir, I did oil it, and the child has been improving ever since."

Bronchitis.—Last January a desperate case came under my care, which in spite of active treatment became rapidly worse. As a last resource I smeared it all over with salad oil, and, to my utter astonishment, there was a marked improvement in the breathing in less that twenty minutes. In a few hours the bronchitis entirely subsided.

Another case—double capillary bronchitis, neglected for several days—came under my relative's notice. He considered it too far gone for medicinal measures, and therefore ordered it to be oiled every four hours. The next day the symptoms had diminished in severity, and on the morning of the third day the child was sitting up in bed taking food, and to all appearance convalescent.

Convulsions.—In these cases the effect of oiling is sometimes truly surprising, the fit ceasing before the completion of the operation, and not subsequently returning. A patient informs me that whenever she observes the symptoms which used to precede convulsions in her boy, she at once oils him, when a calm sleep follows, from which the child wakes up refreshed.

Diarrhœa.—Some time since my cousin had an uncontrollable case of diarrhœa under his care in a child of seventeen months. I advised him to give oil a trial; but he said it was too far gone for anything to be done. I saw the little sufferer myself a day or two afterwards, and ordered it to be oiled every six hours. There was a marked improvement immediately after the first application. By the next day the prostration was gone. Previous to this attack the child was a "puny little thing;" but now (oiling three times a week having been persisted in up to the present time) it is "a splendid boy."

Enlarged liver in a rickety child, with bronchitis supervening.—This case had been under the care of a well-known hospital physician, who gave it up, saying that nothing more could be done for it. I ordered it to be oiled every six hours. After each application a calm sleep followed. In about seventy-two hours the bronchitis began to give way; and a few days afterwards the liver was observed to have diminished in size. The child has not since ailed.

Such is a sample of a few of the cases which have come under my notice. Did I not confine these notes to infantile disorders, a long string of other complaints, which are to be benefited or cured by oiling, might be added. It seems as though the good old Greek and Roman practice will have to come up again. Such is progress!—*Lancet, Jan.* 22, 1870, *p.* 114.

103.—ON IPECACUANHA IN THE VOMITING OF PREGNANCY, AND IN SICKNESS AND DIARRHŒA OF CHILDREN.

By C. C. FULLER, Esq., London.

I have been induced to make the following communication in answer to Dr. Anstie's invitation to those who have studied the action of small doses of ipecacuanha in vomiting and other diseases to make public their experience. I was led by the recommendation of a medical friend to test the value of small doses of ipecacuanha; and I did so, but with the greatest scepticism, and with the fullest expectation of finding these small doses useless. It was only after repeated successes that I was compelled to believe in the efficacy of this treatment in the following classes of cases:—

1. *Vomiting of Pregnancy.*—Having given extended trials of the following remedies in this disease—viz., hydrocyanic acid, nitrate of potash, oxalate of cerium, opium, nitro-muriatic acid, bismuth, alkalies, and quinine; and though each of these remedies was frequently useful, I am convinced that they are all far inferior to ipecacuanha. Its effects are frequently conspicuous in the most severe cases; and it is able not only to control that vomiting which occurs on rising in the morning, but also the more severe forms in which the nausea, retching, and vomiting are almost incessant. The following are brief accounts of two of the cases which occurred under my notice:—

Mrs. W., aged 32, mother of four children, had always suffered during the whole period of her previous pregnancies from severe retching and vomiting, repeated many times a day. On the present occasion she was in the fifth week of her pregnancy, and her sufferings from retching and vomiting were as severe as in former times. She was ordered to take a drop of ipecacuanha wine in a teaspoonful of water every hour, and on the second day of this treatment all retching and vomiting had ceased. The medicine was then discontinued, and was only taken in drop doses on the occurrence of nausea, which it immediately removed. One dose of the medicine was usually taken during the remainder of her pregnancy on each day.

Mrs. D., was in most respects similar to the previous patient. She had three children and during the whole period of each pregnancy she was tormented with sickness and retching, repeated many times a day. After using several remedies without success, the drop-dose of ipecacuanha wine was ordered and the most marked relief followed after the lapse of eight hours. It was given, as in the former case, every hour; and discontinued and resorted to in precisely the same manner and with the same satisfactory results.

I could easily refer to other cases equally successful, but these will serve as examples of the efficacy of this treatment. A more extended experience has proved that a dose administered every four hours is sufficient to secure the desired result.

2. *Sickness and diarrhœa of children.*—In this troublesome and frequent affection of children, a drop of ipecacuanha wine, administered every hour, or less frequently, according to the severity of the disease, is most successful. Under its influence the sickness almost immediately subsides and the diarrhœa abates, although the latter may continue one or two days longer, and in a few cases, although very much controlled, may require another remedy to remove it. Its use is indicated when the motions are *frequent* and *slimy*, and also when they are of a *grass-green colour;* and it is also highly efficacious in this form

of dysentery when unaccompanied by vomiting; but the presence of sickness may be accepted as a special indication of its usefulness, and rarely will it be found to fail where sickness and slimy diarrhœa are present. The notes of numerous cases have been preserved, but it is unnecessary to give a detailed account of them, as they all presented the symptoms above mentioned.

The same treatment will sometimes prevail over other forms of vomiting, as the following case proves:—

Mrs. H., aged 67, had suffered from occasional vomiting for about four years. The attacks would last for from about ten days to a fortnight. She was never a month without one of these attacks. The vomiting frequently followed from fifteen minutes to half an hour after taking food, but sometimes an hour elapsed before its occurrence. These attacks were treated by several medical men, and relief obtained, but they recurred as stated above. No cause of the complaint could be discovered. Recourse was had to drop doses of ipecacuanha wine every four hours, but no apparent relief from the vomiting resulted until four days had elapsed, although the patient asserted she felt better. At the expiration of that period the sickness ceased, and from that time (more than a year since) she has had no return of the sickness, although she is obliged to have recourse to the medicine on the occurrence of feelings which experience has taught her are the precursors of her attacks.

In conclusion, it is right to mention that cases of other forms of vomiting have occurred in my practice, which have entirely resisted this treatment. Contrary to the experience of some, I have obtained at present no success from ipecacuanha in the vomiting of drunkards, and it is useless to expect that ipecacuanha or any other medicine should be a panacea for all forms of vomiting.—*Lancet, Dec.* 4, 1869, *p.* 768.

ADDENDA.

104.—ON CHLORAL HYDRATE.

By the EDITOR OF THE LANCET.

This interesting drug has now been sufficiently tested by a large number of eminent practitioners to enable us to form a tolerably clear idea both of its merits and its defects; and as we perceive that (after the usual fashion in matters medical) there is going to be an epidemic rage for the new remedy, it may be well to call the attention of the public to the principal features of its action which can be said to be fairly made out.

In the first place, the term "anæsthetic" should no longer be applied to chloral, for it has entirely failed to make good its claim to this reputation; even the largest doses do but produce a heavy and prolonged sleep, which is, however, essentially different from true anæsthesia. On the other hand, as a producer of sleep, chloral is, in many respects, unrivalled; for though, like every other remedy, it fails in a considerable number of cases, it does succeed in a very large number; in fact, it is inferior in certainty, as a hypnotic, to opium alone. Moreover, it is very greatly superior to opium, and almost every other drug, in the character of its sleep-producing action; there are no attendant symptoms of cerebral oppression; the sleep, though often prolonged, is light and refreshing, and no unpleasant after-symptoms are experienced. It is important to observe, however, that this description only applies to the use of moderate quantities, and that not only unpleasant but highly dangerous symptoms have been produced by doses which we regret to see are very commonly used. Very careful inquiry leads us to assert that it is both unnecessary and dangerous to give larger doses than twenty to thirty grains, repeated once or twice if necessary, for hypnotic purposes. Doubtless it might happen that 100 consecutive patients might take much larger doses with impunity, but the 101st might present the alarming symptoms described by Dr. Reynolds, in a recent number of the *Practitioner*, as produced by a dose of fifty grains, and these symptoms might easily take a fatal turn.

As a remedy for pain, chloral holds a very varying place in the estimation of medical men, some rating it highly, and others thinking it almost worthless. Perhaps the safest estimate of its

power over pain is that it only exerts an indirect influence, by inducing a disposition to sleep, in which the pain is forgotten. Certainly it has entirely failed, in the hands of the present writer, to relieve severe pain of a pure neuralgic type. On the other hand, there is a good deal of evidence that it relieves suffering where the parts are very *tense*, and where mere arterial *throbbing* counts for much in the production of the pain; thus it has been very favourably spoken of for its effects in gout. And this fact, if it be correct, corresponds with certain observations which have been made as to its action on the circulation. Both from sphygmographic experiments on healthy persons and on patients, and also from the details of the nearly fatal case reported by Dr. Reynolds, there is reason to think that chloral exerts a contracting influence upon the arterioles, powerful in proportion to the dose; and it may well be that arterial throbbing is checked by this kind of influence.

On the whole, however, there can be little doubt that the great function of chloral is that of hypnotic, and calmer of general nervous irritability. In delirium tremens it is excellent; and it is probable that with two such weapons for choice as bromide of potassium and chloral we shall be able almost entirely to dispense with the use of opium, which is so uncertain and dangerous a remedy in that disease. In the state of sleeplessness which threatens the access of puerperal mania, chloral is probably an unequalled remedy. In melancholia its action as a hypnotic appears to be powerful and remarkably sure. In mania, also, it acts well enough as a hypnotic, though there seems some division of opinion as to whether it does permanent good. We may also state that in the irritable condition of aged persons who find it difficult to sleep for any length of time continuously, the use of a single dose of thirty grains of chloral appears often to answer excellently well. The minor uses of the drug in relieving more trivial conditions of nervous irritation, and in alleviating painful spasmodic symptoms of various kinds, are probably considerable.—*Lancet, March* 19, 1870, *p.* 421.

105.—THERAPEUTIC NOTE ON CHLORAL.

By the late Sir J. Y. Simpson, Bart., M.D., D.C.L.

[Several years ago, when discussing the past history and future advances of materia medica, Sir James Simpson prophecied that amongst the new organic compounds almost daily discovered, some narcotic would be found "as important as that most useful of all drugs—opium—and yet without either its direct constipating effects, or its indirect tendency to excite subsequent nausea."]

Chloral C_2Ch_3OH, an artificial organic chemical compound, was discovered by Baron Liebig in 1832. Both in its fluid form and when solidified by the addition of a little water into hydrate of chloral, it has been known during the last thirty-seven years chiefly as a chemical curiosity. But lately Dr. Liebreich, of Berlin, has suggested hydrate of chloral as an hypnotic and anæsthetic remedy. I am indebted to the courtesy of Dr. Liebreich for sending me an early specimen of this new drug, and latterly I have used it to a considerable extent in practice. My impression is that, in introducing chloral, Dr. Liebreich has proposed a remedy which will yet prove of immense value in the practice of Medicine, Surgery, and Midwifery.

Hitherto I have principally employed it as an hpynotic and anodyne. In sufficient doses I have found it, as a general law, as sure a producer of sleep and soother of pain as opium or any of its preparations. It is usually swifter in the induction of its narcotism, more tranquil in its action, and more prolonged in its effects than opiates are when taken as hypnotics; but above all, it seems, in a great measure, free from some of the minor drawbacks and disagreeable accompaniments produced by a full and large dose of opium. In this respect it appears to me to fulfil successfully the indications which I predicted in the extract above given, of being a narcotic as powerful, and indeed more powerful, than opium, "and yet without either its direct constipating effects, or its indirect tendency to excite subsequent nausea, vomiting, &c." The sleep induced by a full dose of it steals on without any premonitory symptoms. It is usually deeper, and yet more quiet and calm, than that produced by opium; and it does not leave subsequently the thirst, dry throat and tongue, disturbance of stomach and appetite, and languor of mind as well as body, which most persons unaccustomed to the use of opium commonly feel after a deep and narcotic dose of that drug.

Sometimes chloral produces its hypnotic effects when opium, from its long-continued use, has ceased to do so. To a patient who has had daily morphia injected subcutaneously for some years for neuralgia of the side under the hands of different practitioners, my assistant, Dr. Bell, gave at my request a drachm dose of chloral. Latterly a grain of morphia has been injected daily with the effect of relieving the pain, but without producing sleep. She swallowed the dose of chloral early in the afternoon, and was asked to lie down in bed. I saw her in a quarter of an hour afterwards deeply asleep; and the lifting of one eyelid to look at the dilated pupil did not awaken her. She awoke out of the slumber free from her neuralgia.

I am not aware of any special contraindications to the employment of chloral when used for somniferous purposes. Even in

head and chest affections, where I should have been chary of having recourse to opium as an hypnotic, I have employed chloral with perfect success. The contraindications to opium offered by a tendency to constipation, &c., do not exist against chloral.

Like all other remedies in the Pharmacopœia, it will, no doubt, occasionally fail to produce its desired effect; but as seldom so, perhaps, as most of them. In a few instances the sleep induced by it has been dreamy and hysterical, particularly when the patient was not kept in a state of perfect quietude; but these are rare exceptions to the general rule.

In the present remarks I have spoken specially of the somniferous or hypnotic powers of chloral. I have used it for other purposes, but it is not my intention to dwell upon them at present. It will not fulfil all the many and almost endless indications for which opium is used in medicine; but I have seen enough to convince me that it will prove a very valuable anodyne in some cases of neuralgia, hysteralgia, dysmenorrhœa, pleurodynia, &c., and in the pains attendant upon cancer and acute local inflammations. In some cases of irritable bladder and chronic cystitis I have found it give the patient much longer and more perfect rest than large doses of opium. In several instances it has seemed to me, when given in small and repeated doses, to soothe down both acute and chronic cough with remarkable effect; and I have known it to relieve asthma. Lately in a young lady whom I saw in consultation with Dr. Taylor, suffering under a severe attack of congestive bronchitis with some hæmoptysis, orthopnœa, a small dose (twenty grains) of chloral was given at night. "She speedily fell asleep," wrote Dr. Taylor to me the next day, "and slept soundly until 4 a.m., when she sat forward in bed and coughed, but appeared to be only half awake. When I called in the morning at 10.30 she was still enjoying a most placid slumber. As I contrast," Dr. Taylor adds, "the distressed and audible breathing of last night with the tranquil sleep and improved state of the patient to-day, I cannot help concluding that chloral has a directly sedative effect on the whole respiratory surfaces."

Occasionally I have exhibited chloral in continuous small doses for one, two, or more weeks in succession, and apparently with most marked benefit, particularly in cases of chorea, threatened or incipient insanity, &c. A patient from Illinois, who, for several years, has always regularly suffered excruciating spasmodic pain in the left iliac region, attended with some discharge, for eight days before menstruation began (she has disease of the fundus uteri and left Fallopian tube), has, during the last two periods, kept at bay this old and formidable suffering by taking chloral night and morning during the threatenings

of it. She strongly assures me that formerly she had used very large doses of opium and other anodynes without any such favourable effect. I have found the parturient uterus to go on contracting regularly and strongly when the patient was so deeply asleep under chloral as to be only very imperfectly wakened up with the expulsive efforts of labour.

It has been employed in continued fevers to induce sleep and quietude and reduce the pulse. Dr. Liebreich speaks of its utility in rheumatism, convulsive coughs, tetanus, acute mania, and delirium tremens, and as a sedative after surgical operations.

The dose of chloral to an adult for an hypnotic which I have usually employed has varied from 50 to 60 grains; but 25 to 30 grains suffice in some patients. In a case of long-standing sleeplessness, and which had resisted great doses of opium, Indian hemp, &c., 120 grains failed to produce any effect. When used for anodyne and other medicinal purposes, a continuation of smaller doses—as 10 or 20 grains several times a day—is sufficient.

In administering chloral I have given it only by the mouth and by enema; almost always as a draught. It is somewhat acrid and pungent to most palates, and hence requires to be diluted well with water, and to have added to it a large quantity of syrup.—*Medical Times and Gazette, Jan.* 1, 1870, *p.* 4.

106.—ON THE USE OF HYDRATE OF CHLORAL.

By Dr. HENRY MAUND, Sandown, Isle of Wight.

In the early days of hydrate of chloral I had a specimen sent to me, for trial, by a London chemist, and since then I have used it somewhat extensively. The following is the result of my experience:—

1st. It is a valuable hypnotic, producing quiet sleep in some cases where the preparations of opium are useless or distressing.

2nd. It is an uncertain remedy; but I think one cause of its uncertainty may be explained by the fact that its influence is resisted by those habituated to the use of alcohol. Fifteen grains has proved an efficient dose for a "total abstainer," and I have known twenty grains give fourteen hours' sleep after morphia had failed; while a fifty-grain dose has several times proved quite inert on a "free liver."

3rd. I have failed to derive any benefit from its use in asthma, whooping-cough, and other spasmodic diseases, unless it induces sleep. If it does not cause sleep, it produces no effect, distressing or otherwise; hence its great advantage, in some cases, over opiates.

4th. It sometimes causes frightful dreams. Two patients have refused to continue its use on this account, although in both cases it produced, apparently, quiet sleep.

5th. It should be used with caution. In private practice, not more than twenty grains should be given for a first dose, or much alarm may be caused by the prolonged sleep sometimes produced by a large dose.—*Lancet, March* 19, 1870, *p.* 409.

107.—AN ANTIDOTE TO CHLORAL.

By Dr. LIEBREICH, Berlin.

M. Liebreich, after having studied and made known the physiological properties of hydrate of chloral, has directed his attention to the obtainment of a remedy which may counteract the baneful effects of the substance. This antidote he asserts to be strychnia. The results of M. Liebreich's novel researches were laid before the French Academy of Sciences a few days ago, by Professor Wurtz, of the Paris Faculty. M. Wurtz stated that the attention of the Berlin experimenter had been drawn to strychnia by the observation of a case of trismus, which, after having persisted eight days, was immediately cured on the employment of chloral. This led him to produce, artificially, the phenomena of tetanus in animals by the administration of strychnia, in order to study the effects of chloral on this artificial condition. He then observed that chloral diminished the effects of strychnia, provided it were exhibited very soon after the administration of the alkaloid.

Another important result was obtained when M. Liebreich, pursuing his researches, discovered the effect of strychnine on animals poisoned by large doses of chloral.

He then made out that strychina, administered after a too heavy dose of chloral, shortens and destroys the effects of this substance, yet without producing the injurious action which it exhibits in ordinary cases. Therefore, M. Liebreich proposes to employ injections of nitrate of strychnia as an antidote in cases where accidents have occurred through an over-dose of chloral or chloroform.

[Dr. Bence Jones communicates to the *Medical Times and Gazette* the following passage from a note by Professor Dubois-Reymond:]

Liebreich has recently added a very interesting fact to our knowledge of chloral. He takes three rabbits of equal size, and into one (A) he injects two grammes of chloral. Into another (B) he injects 0·0015 grammes of strychnia. Into the third (C) he injects first the same dose of chloral, and, after the chloral

has begun to act, the same dose of strychnia. (The injections are made under the skin of the back.) The chloral is injected in four portions, and the strychnia at once. Two grammes of chloral for a rabbit of 1·5 kilos. are equal to 100 grammes for a grown-up man of 75 kilos. (a dose absolutely mortal). The rabbit (A) collapses very soon. Touching the cornea seems to cause contraction of the lids, and (A) dies after perhaps half an hour. The dose of strychnia administered to (B) is also absolutely mortal. After eight minutes the strongest tetanus ensues, and generally after twelve minutes the rabbit dies, and half an hour afterwards it already becomes stiff.

Now, the new fact is this. The rabbit (C) which has received the dose of strychnia after that of chloral very soon revives; never shows a distinct attack of tetanus; one hour and a half after the beginning of the experiment gets upon its legs, and soon after will feed as though nothing had happened.

I have witnessed the experiment up to the stage when A was dead, B dead and stiff with rigor mortis, and C rallying and trying to sit up.

So we have the extraordinary fact of the action of chloral and strychnia interfering with one another, and strychnia proving an antidote in the case of chloral poisoning. The reverse does not happen, because the action of strychnia is too rapid compared to that of chloral. The animal poisoned with strychnia dies of tetanus before the chloral is fairly brought into action.

Liebreich was led to these experiments by the result of a strong dose of chloral administered to a patient with idiopathic tetanus. The jaws, which had not been opened for a week, relaxed, and the patient could take some food. Eventually, however, he died.—*Lancet, March* 12, 1870, *and Medical Times, Dec.* 18, 1869, *pp.* 387, 723.

108.—SYRUP OF HYDRATE OF CHLORAL.

The hydrate of chloral is coming largely into use as a soothing medicine, and any preparation which tends to render it more easily taken will be welcome. Messrs. Ferris & Co., Union Street, Bristol, have succeeded in preparing a tolerably palatable, and easily dosed syrup, which will save much trouble in dispensing. We have administered it in a case of obstinate irritable cough during pregnancy and in another of sleeplessness from general malaise and mental anxiety, and have found it agree perfectly, and produce the desired results in both cases. We may add that the syrup contains ten grains of pure chloral to the drachm, and that the price is eight shillings per pound.—*Medical Times and Gazette, Feb.* 12, 1870, *p.* 189.

109.—ON THE USE OF CHLORAL AS AN ADJUVANT TO CHLOROFORM AND OPIUM.

By LAWSON TAIT, Esq., Wakefield.

In addition to the well-known hypnotic action of this drug it may be well for those of your readers who have not had the experience to know that it is a valuable adjuvant to chloroform and opium. I have at present a patient whose case presents many points of interest, of which I intend to make further use. She required the hypodermic injection of nearly twenty-four grains of the bimeconate of morphia daily for the relief of pain; and even this enormous quantity never had the effect of really producing sleep, while it made her sick and destroyed her appetite. When the bed linen required changing it was necessary to put her thoroughly under the influence of chloroform, and this was seldom effected by a quantity less than an ounce. From sixty to eighty grains of chloral hydrate now produce a quiet slumber, which lasts from twelve to sixteen hours, and during this time she frequently wakes, free from pain, to partake of nourishment. When any operative measure or change is required, if the chloral is in action the inhalation of a few drops of chloroform produces the most profound anæsthesia. She suffers from occasional diarrhœa, and this is effectually checked by the addition of ten drops of laudanum to the starch enema in which the chloral is administered, This facility for the combination of the action of chloral and chloroform will, I believe, prove invaluable in obstetric and surgical practice. I have used in the past week nearly a pound weight of chloral hydrate, and become more impressed with its value in every fresh case in which I use it.—*Medical Times and Gazette, Feb.* 12, 1870, *p.* 193.

110.—ON THE HYDRATE OF CHLORAL.

Hydrate of chloral is the drug at present exciting most attention. As yet we know nothing very definite in regard to its action. M. Bouchut says it is a sedative to both motor and sensitive nerves. He says that if the chloral is not crystallized and sufficiently purified to disengage, under the influence of potash, chloroform fumes without the liquid becoming coloured, it is impure, and may be dangerous. He says it ought not to be given to adults in doses larger that five grammes (77 grs.), and that to infants, not more than one or two grammes (15 to 30 grs.) ought to be administered. It may be given *per orem* or *per anum*, the latter mode being said to be more rapid in its action. It is dangerous to administer chloral hypodermically in man. Arterial tension is always augmented during the sleep induced by chloral. The urine passed after a chloral slumber

is neutral, and does not reduce the copper of Fehling's solution. Twenty-four hours afterwards, however, the urine is more dense, and it reduces the copper of Fehling's solution like a temporary glycosuria. The action of chloral is precisely that of chloroform, but it is produced more slowly, and lasts much longer In some it produces all the symptoms of drunkenness; in almost all slumber, rarely associated with hyperæsthesia, more commonly with a remarkable degree of anæsthesia. The degree of anæsthesia seems to depend upon the dose employed; two to five grammes (30 to 77 grs.) according to the age, producing such complete anæsthesia, as to permit of the extraction of teeth, or the painless application of the Vienna paste. Chloral is also the most prompt and efficacious remedy in those cases of intense chorea, where the constancy and severity of the spasmodic movements threatens the life of the patient.—*Gazette Hebdom.*, Nov. 1869.

[In our hands, thirty grains have proved a safe and admirable hypnotic; a less dose has never sufficed, and only in one case have any unpleasant symptoms been developed; these were, insensibility, with coldness and rigidity of the extremities—phenomena which occasionally occur in the chloroform narcosis. Pure chloral must be very cautiously administered in doses over thirty grains. It seems to have no influence, save a merely temporary one, over the spasmodic movements of chorea.—ED. *E. M. J.*]—*Edinburgh Medical Journal, Jan.* 1870, *p.* 669.]

111.—NOTES OF TWO CASES TREATED BY THE HYDRATE OF CHLORAL.

By ALEXANDER MAXWELL ADAMS, Esq., Surgeon to the 2nd Royal Lanark Militia.

[The first of the following cases (one of puerperal mania) is still under treatment, but the case is complete for the purpose of illustration.]

I attended Mrs. ——, a very slender and delicate-looking woman, on the 25th of November, with her first child. Her delivery was comparatively easy, and the after-progress of the case satisfactory, until the morning of the 29th, when she began to talk somewhat strangely, and then broke out into a state of the most acute and ungovernable mania. I took off the hair, applied ice to the head, succeeded in getting four leeches to fasten on the temples, and fomented the abdomen. I also gave thirty grains of the bromide of potash, and repeated this dose in two hours. The symptoms of slight congestion with which this case was ushered in rapidly yielded, but the mania con-

tinued with unabated fury. I now gave forty minims of Battley's sedative solution of opium; and as it produced no effect, I again administered within two hours the same dose, but with a like unsatisfactory result. I then put her under the influence of chloroform, thinking that it would aid the opium, and that sleep would follow. No such result, however, attended this plan of treatment, and I then, in about twenty-five hours after her seizure, and many hours after I had given the opium and chloroform, administered forty grains of the hydrate of chloral. Her pulse at this time was almost gone at the wrist, and her extremities were cold; but, strange to say, her struggles were even more ungovernable than during any period of the attack, and her cries were incessant.

In about five minutes after the administration of the chloral she became quite calm and sensible, asked what had been wrong, &c., complained of great drowsiness, and within ten minutes fell into a profound sleep, which lasted for about seven hours. Her pulse also gradually gained in volume, and diminished in frequency, until it fell to 90 beats. Her sleep was rather heavy for the first two hours, but afterwards it became quite natural, and even light.

During the progress of this case, in consequence of a periodic recurrence of the most severe form of mania which it has ever been my misfortune to witness, I have been obliged to give the chloral on about twelve separate occasions, in doses varying from forty to sixty grains, and always with the same result—namely, complete cessation, within a few minutes, of all cries and struggles, a return of calm consciousness, followed by a natural sleep, lasting from between six to eight hours. The pulse also, in a very marked degree, always improved when under its influence.

I had not required to give this remedy for upwards of a fortnight until last night, when the mania reappeared, but in a modified form. I gave forty grains, after which she slept calmly for seven hours. And to-day I find her very much better than she has ever been.

I had a consultation on this case a few days ago with Dr. Warburton Begbie, who agrees with me in considering that, so far as it has gone, my patient's life has been saved by the chloral.

Case 2.—I was called upon, on the 1st Dec., to visit a man labouring under an unusually severe asthmatic paroxysm. He had been a patient some time ago in the Brompton Hospital; and, in consequence of the severity of his seizures, had occasionally to be put under the influence of chloroform. This, however, only gave him, he tells me, very temporary relief. His agony being excessive, I administered thirty grains of the

hydrate of chloral. In a few minutes his breathing became quite easy; and within twenty minutes he fell into a calm sleep, which lasted for eight hours.

[In a later communication, Mr. Adams says that the first mentioned case is progressing most satisfactorily, his patient being able to take daily out-door exercise, and to attend to light household duties. Acute attacks of mania recurred, but were almost instantly quelled by one or two doses of chloral. He then goes on to observe:]

I have used upwards of fourteen ounces of chloral, in my practice, during the past four months, and after mature deliberation, have arrived at the following conclusions regarding its therapeutic action and value as a remedial agent:—That it is quite safe if given with ordinary caution and judgment. My experience would suggest that from twenty-five to thirty grains is a sufficient dose to begin with in ordinary cases for hypnotic purposes; that forty grains may be given in urgent cases at the very outset, but that larger doses ought not to be used until the smaller ones have been fairly tried, and have failed. In such cases I am of opinion that the patient who resists a drachm dose may be said, for all safe and practical purposes, to be insusceptible to its action. That, as a very general rule, it is a pure and uncomplicated hypnotic and calmative, and, therefore, having no other contradictory effects, is not liable, like opium, to aggravate and excite where it was meant to soothe. That it does not occasion any of the disagreeable after-effects peculiar to opium, and that its continued use would not appear to exercise any injurious effects upon the system. That in all disturbed and diseased conditions of the mind and nervous centres, attended with mania, delirium, excitement, sleeplessness, convulsions, &c., chloral stands unrivalled as a certain, swift, safe, and powerful hypnotic and calmative. That in such cases small doses often produce rapid and decided effects. That it is rather uncertain when given as a hypnotic in aggravated neuralgia, and other forms of severe and persistent pain, and that even very large doses are frequently resisted under the above-mentioned circumstances. That it is, upon the whole, a valuable, although uncertain, addition to our anodyne remedies, generally acting as such in consequence of the sleep thereby induced outlasting the pain, and rendering the patient insensible to it. That in many cases, however, it acts directly as an anodyne, independent of its sleep-producing properties. That, when given in repeated small doses, it proves a valuable sedative in a great variety of cases, such as whooping-cough, spasmodic croup, asthma, irritating and exhaustive coughs, chorea, &c.

I now beg to call special attention to the two following

important points connected with the therapeutic action of chloral, which have been repeatedly forced upon my notice:—1st. That chloral will almost instantly, as already indicated, induce sleep where the brain is functionally or organically disturbed, but acts with great uncertainty upon a sound brain where pain is the exciting cause of sleeplessness. 2nd. That in head affections where there is torpidity of the bowels and retention of urine, chloral does not, like opium, encourage this state of matters, but would seem, owing to some reflex action, whilst effectually overpowering undue nervous disturbance, to stimulate or assist the bladder and bowels to a more healthy action. In the case of puerperal mania already mentioned, this fact was so patent that I came to know, to a positive certainty, that, no matter how long the urine and alvine evacuations might be retained, she was certain to void the former freely, and frequently the latter, almost immediately after coming under its influence. This was a most fortunate circumstance, as the use of the catheter would, in such a case, have been a very difficult operation. The above fact has come under my observation quite as pointedly in other cases.—*Lancet, Jan.* 22, *and April* 16, 1870, *pp.* 112, 567.

112.—CASES TREATED BY HYDRATE OF CHLORAL.

By Dr. J. Frederick Plomley, Maidstone.

During the past few weeks I have administered the chloral hydrate on several occasions, and with marked success. Given as a hypnotic, I have found it a much surer producer of sleep than opium or any of its preparations. Another thing greatly in its favour is that (so far as my experience has gone) it is without the unpleasant after-effects of opium—*e.g.*, constipation, loss of appetite, &c. Two of the patients to whom this salt was administered complained of severe headache when first awaking in the morning; but I attributed this, in the one case, to the large quantity of chlorodyne which had been taken a few hours previously for the purpose of allaying pain and inducing sleep, and, in the other, to a cause quite apart from any effect the medicine might have had. In one other case a feeling of intoxication was complained of when first awaking, but this soon passed off.

The first patient to whom I gave the chloral was a gentleman who has been for many years a great sufferer from rheumatic gout, and who has been in the habit of taking almost every night a large dose of opium in one form or another for the purpose of easing his suffering and procuring sleep. As a consequence of this no small amount of gastric disturbance has

resulted. He now takes forty-five grains of the chloral hydrate in place of the opium, and, within ten minutes after doing so, he falls into a sound sleep, which lasts from ten to twelve hours, and awakes in the morning refreshed and with an entire absence of all the unpleasant symptoms of gastric derangement from which he has so long suffered.

In another case, that of a young girl who for some years past has been a great sufferer from bronchitic asthma, the paroxysms of which, occurring every night, have been very severe, and quite prevented sleep, a half-drachm dose of the chloral hydrate, taken a short time before the threatened attack, by inducing sleep, prevents the recurrence of the paroxysm. This patient had previously taken all the remedies usually prescribed for mitigating the severity of asthma, but with very unsatisfactory results. Since she has been taking the chloral hydrate, the attacks, which before were both frequent and severe, have become much less so, and the breathing, which is permanently embarrassed, is certainly much relieved. The cough continues as severe as ever, but the patient expresses herself as "feeling quite a different person" since she has been taking this preparation.

I have little doubt that the chloral hydrate is much to be preferred, both as a hypnotic and anodyne, to opium or any other drug with which I am acquainted; and I firmly believe that, as it becomes more generally appreciated by the profession and the public at large, it will be found one of the most valuable remedies of its class which we possess.—*Lancet, Feb.* 26, 1870, *p.* 300.

113.—CLINICAL OBSERVATIONS ON HYDRATE OF CHLORAL AS A HYPNOTIC IN TYPHUS.

By Dr. JAMES B. RUSSELL, B.A., Physician to the City of Glasgow Fever Hospital.

[In the treatment of the cerebral complications of febrile disease opiates are capricious in their effects, and some sedative safer in its action is particularly desirable.]

In three of my cases, after a 40-grain dose, the toxic effect upon the heart was manifest. In one case only, the 4th, irregularity was developed by so small a dose as twenty grains, but lowered frequency was not uncommon. The large dose was given also twice to a bulky, robust man, but did not affect the heart, so far at least as to cause irregularity. The pulse seemed, but with exceptions, at first and that speedily to improve in quality, but in an hour it became soft and small, sometimes lowered in frequency, and finally the action of the

heart became irregular. Although it is difficult to eliminate from the sedative effects of mere repose on the respiratory and circulatory organs of a delirious person, those which are due to the drug which induces the repose, there can be little question that the chloral acted directly and specially on the heart in these instances. In many of the cases also, from the aspect of the countenance, flushed and full, and from the improved colour of the rash, brightening when petechial—the impression of stimulated action which we have said the pulse at the very first, and for a short time, conveys, receives further confirmation. The breathing also is quickened and short, but not laboured. These phenomena, are, however, of the most transient description, and soon give place to those with which we are familiar in natural sleep. The state of the pupil is the same—contracted to the utmost, as in the "pin-hole pupil" of Graves; but, differing from the contracted pupil of narcosis, it expands in the chloral sleep immediately the patient is awaked. The power of voluntary motion seemed never to be in abeyance, but always at command as in natural sleep; and no change in the susceptibility of sensation was present. The sedative effect on the brain and nervous system was sometimes visible in a few minutes, but seldom became developed into true sleep and unconsciousness until from ten to twenty minutes. The transition from waking to sleeping was noted to be often very sudden. If disturbed by any external or internal irritation, as by counting the pulse, for instance, the patient often looked up, with natural or dilated pupil, then turned on one side, seemed to sleep *at once*, and on lifting eyelid, no movement was caused, and the pupil was found to be almost abolished. According to Richardson, thorough narcosis from chloral is accompanied, in the rabbit at least, by dilated pupil. In Case 1 it will be observed that the pupil remained for a perceptible period contracted, as in opiate narcosis, after the patient had been roused by pinching. Dilatation was never observed from the doses employed in my cases.

Therapeutic action of Chloral.—The therapeutic action desired was sedative and hypnotic, and as such my table of cases shows that it was successful in almost every form of cerebral excitement incident to febrile disease, with remarkable uniformity and rapidity.

Chloral seems to have a more immediate and permanent curative action on such cases of acute delirium, at the acme of typhus, than in the *delirium tremens* of the second and third weeks, when the blood is loaded with the products of the fever and there are general tremors and subsultus.

Case 17 is a good example, where two hours' unbroken sleep, followed by interrupted sleep during the entire day, was pro-

duced by ten grains in a boy of fourteen. In both instances the patient became sensible and continued so. This permanently curative action was frequent, as the table shows, and more common in the active than in the adynamic form of delirium. Although this adynamic delirium, or the *delirium tremens* of typhus, as I call it, was less promptly amenable to chloral, as it is to all sedatives, Case, 6, 13, and 18 show excellent results. Indeed, there is no other sedative but chloral which I should have ventured to administer, still less to repeat, in the last two. Seeing that the delirium depends in such cases on the presence of impurities in the blood, the elimination of which is a process requiring time, all that we can expect from a sedative which does not act by hastening elimination, is to soothe from time to time, and to check vital exhaustion until the process is completed by the natural channels. In this aspect, the chloral appears in no case to better advantage. We shall quote Case 18 as an illustration of its beneficial action in one of the worst cases of such adynamic delirium I have ever seen; it even controlled the subsultus for a time.

In Case 13, there was bronchitis and congestion of both lungs—a state of matters which forbids the use of opium—but chloral was given from time to time, producing sleep, without promoting pulmonary stasis. In Case 15, the restlessness of tubercular meningitis supervening on typhus, in an infant aged 18 months, was temporarily calmed by a dose of 2 grains. The general statistics of results in all cases are as follows:—Chloral was administered 32 times in the treatment of 21 cases. Of these 32 doses, 24 were followed by sound and well-marked sleep, lasting without interruption from 1 to 5 hours, and nearly always prolonged by a succeeding period of broken sleep and general tranquillity, 3 doses had a decidedly, 4, a partially soothing effect, and 1 proved inert; but this last dose was immediately vomited and ought not therefore to be counted. Looking to the 21 individual cases, we find that *not one proved insensible to the chloral when repeated.* I never met with an equal number of consecutive cases of delirium, &c., in which any other sedative showed such uniformity of action, or even approximated to it.

Comparative effects of chloral and other hypnotics.—In the treatment of fever one has necessarily an unusual opportunity of studying the effects of hypnotics and sedatives. Very few cases pass through the physician's hands without at some period demanding the use of some means of producing sleep artificially; and the question which to employ is neither unimportant nor easy of solution. I have a very decided opinion as to the danger attending the use of opiates in fever, no matter how guarded with eliminants, as antimony, grey powder, &c. Nothing

astonishes me more, as being opposed to my whole experience of their disastrous results, than the free and unguarded way in which preparations of opium, either alone or combined, are recommended even in treatises on fever, and employed by some practitioners. From the want of a better agent, I have hitherto, after Graves, used Battley with tartar-emetic (5 drops to $\frac{1}{12}$ grain), but I never order such a draught without apprehension, and have repeatedly seen patients put into a dangerous state of narcosis even by *one* such minute dose, a state always requiring active and prompt measures to save the life, and not unfrequently ending in fatal coma, or pulmonary engorgement or congestion. As is well-known, opium always cripples the eliminating functions, especially of the kidneys; and as antagonistic to this action, I always combine with it some diuretic. Even in health you cannot develop the narcotic action of opium without this effect on the excretions. The general action on the nervous and muscular tissues is also paralyzing. The bronchial muscles and epithelium, and the external muscles of respiration, share in the narcotic paralysis. Hence the invariable tendency in opium poisoning to stasis of the blood in the pulmonary vessels, and of the bronchial secretion in the bronchi. Suppose now a case of typhus in the second week, in a state of sleepless delirium from the circulation of poisoned blood through the brain. The cerebro-spinal nervous system manifests the results of its impaired nutrition by violent excitement, or low muttering insomnia; the muscles also, voluntary and involuntary, suffer changes of structure, which can be seen under the microscope; the external muscles of respiration are partially paralyzed, and stasis, set agoing in the lungs by the altered relation of the impure blood to the capillaries, is promoted by the imperfect expansion of the chest wall. The external and internal pathological conditions act and react on each other. When, therefore, we give an opiate to a typhus patient we combine two similar pathological tendencies, and may precipitate into narcosis functions which were previously on the brink, and by cautious management might have been preserved in some measure of vital activity. It is impossible to say what dose will *not* have this effect. As I have said, 5 drops of Battley and $\frac{1}{12}$ gr. of antim. tart. will do it. In rare cases I have seen even the slight lowering of vital action, which accompanies natural sleep (in this case, however, sleep coming without artificial aid to a blood-poisoned fever patient), develop in a case such as I have described, congestion of the lungs, general lividity, and partial coma. But, as a rule, in natural sleep there are no such dangers, and it is the almost perfect analogy between natural sleep and the sleep induced by chloral, in properly adjusted doses, which commends that drug to my mind as the best hypnotic in febrile diseases.

I am well aware that the clinical experiments here recorded are but limited, and that my conclusions must be subjected to prolonged trial and observation before they can be thoroughly established. Still I see in the chloral sleep something different from opium sleep, and both positive and negative properties in the former drug, which mark it as safer than the latter. 1. The action of the pupil to which I have aleady alluded illustrates excellently the close approximation to a natural sleep which chloral bestows, and the difference between it and opium in physiological effect. In all forms of sleep the pupil is contracted to the utmost. But, in natural sleep, the moment the sleeper is roused, and the eyes are opened, the pupil expands; while in an opium sleep the pupil remains contracted, it may be only for a few seconds, or for minutes, or hours. This illustrates in little the general condition of the nervous and muscular system in natural and chloral sleep, and in opium and other narcotic forms of sleep. As we have seen, the chloral sleeper may be roused at any time. He is at once in the full command of his functions, he may take food, pass urine, cough with full strength, expectorate, &c.; and whenever the temporary excitation ceases, he may drop over again into unconsciousness. Indeed, as a rule, the chloral sleep consists of a continuous initiatory stage, followed by a period which may extend over six, eight, or more hours of sleep, interrupted by intervals in which food, &c., may be given without the necessity of waking the patient, or any risk of re-establishing the excitement. This was specially noted in some of our cases, as in Case 7, "8 p.m. Sleeping; had drinks at intervals, falling asleep at once afterwards." Not so with the patient after an opiate which will produce an equally sedative effect. His pupils are small; if his lungs are gorged with mucus, he has neither the intelligence to see the necessity, nor the muscular energy at command to cough and expectorate. 2. The excretions are not affected by chloral. They are by opium. The bowels are made costive, the urine scanty, the mouth parched, and the skin dry. 3. The administration of an opiate to a child is in any circumstances a procedure which the practitioner adopts with misgivings. Chloral may be given with perfect safety, and with perfect success. 4. Opiates, even as combined by Graves, with tartar emetic, are uncertain, very frequently quite futile. As already stated, I have met with no patient who resisted the action of chloral.

I have contrasted chloral with opium at much length, because opium is really the only hypnotic of sufficient value to be contrasted with it. Having, in the course of practice, gradually acquired the opinions regarding its dangers in fever, to which I have already given strong expression, it was natural that I should employ any drug or method which promised good results

as a sedative. Space forbids any lengthened reference to this partly experimental practice. For some time, the bromide of potassium and cold-sponging have almost entirely displaced Graves' mixture, and Battley and ether, which, for a long time, were my only sedatives. The bromide, formerly tried, but imperfectly, and thrown aside, was revived by Dr. Tennent, at the request of the Professor of Materia Medica in the University, and has been extensively used. It is capricious, sometimes acting with excellent effect, but oftener proving useless in apparently similar circumstances. We give it in drachm doses, three times repeated, at intervals of an hour. It rarely acts, even when the best results ultimately follow, within forty-five minutes, or an hour. No dysphagia or other toxic effect has ever been observed, and its narcotic action manifests none of the dangerous tendencies of opium. Chloral, however, far excels the bromide in efficiency and certainty. In cases 4, 6, and 7, where chloral produced prolonged sleep, followed by no recurrence of delirium, it was appealed to after the bromide had failed. *Cold sponging*, again, soothes, by the abstraction of heat from the periphery, and is consequently useful only in the acute delirium and insomnia of the acme of fever, when the skin is pungently hot, and the condition such as I usually describe by the adjective "fiery." In these circumstances, sponging with iced water every two or four hours, has often a calmative effect. During the prolonged course of Case 5, various sedatives were used. The effects of the bromide, though not so rapidly produced, were quite as good as those of the chloral in this case.

Dose of chloral. Mode of administration. Dangers.—My first cases proved conclusively, that for the class of patients under my care, 40 grains is a toxic dose. It produced depression and irregularity of the heart's action. In my cases, all the benefits without the dangers of chloral were obtained with 20 grain doses for adults; 2 grains for an infant of 18 months; 3 grains for two of three years; 10 grains for children of 9 and 14 years. The drug was given in an ounce of water sweetened with half an ounce of syrup. Children take the draught quite readily in this way, and like it. If not sufficiently diluted, the medicine is vomited, as in Case 1, where 30 grains were dissolved in only half-an-ounce of water and syrup. When sufficiently diluted it may be borne by the most irritable stomach, as it was in Case 10, in which nutrient enemata were required from obstinate vomiting, and yet the chloral was not rejected. The dangers of an over dose of chloral are manifest from the cases in which 40 grains were administered. The depressing action of chloral on the cardiac ganglia is then developed. For the sake of the purity of the experiment, in some of my cases, all stimulants, and to some extent even food, were prohibited. This is, how-

ever, unnecessary, especially in view of the readiness with which the chloral, like the natural sleep, may be broken and resumed. Indeed the same rule applies here as to all the circumstances of a fever patient,—not to interrupt the regular administration of food for any cause and remembering that we are dealing with a drug which has a special action on the heart, we should first be cautious in adapting the dose to the age and vigour of the patient; and then, having given it, should watch the pulse at intervals, more particularly during the next six hours.

The mode of action of chloral.—This theoretical question assumes some practical importance when we employ chloral in typhus. According to Liebreich, the ultimate physiological action is not that of chloral, but of chloroform produced by the decomposition of chloral by the alkalis of the blood. This theory is strongly supported by the fact that chloral mixed with fresh blood does evolve chloroform. M. Personne and Dr. Richardson agree with Liebreich. Indeed M. Personne has gone further in the proof of the theory by demonstrating the presence of *chloroform in the blood* of dogs, to whom *chloral alone* had been administered. Now it is well known that the tendency of the typhus process, as it advances, is to *increase the alkalinity* of the fluids of the body. Ammonia can be detected in all the excretions in an amount much greater than in health. The urine, at the close of a severe case, gives off free ammonia so copiously as to cause lachrymation, and to be sometimes quite unbearable by one auscultating the back, for example, of a patient passing it involuntarily. "There is good reason for believing," says Murchison, "that the unnatural fluid state [of the blood] in typhus results from an abnormal amount of ammonia." Whatever may be the precise pathological product, there is no doubt of the fact that typhus blood is more highly alkaline than the blood in health. Hence, if its action depends upon alkalinity at all, and M. Personne seems to have demonstrated that fact, then chloral must be *par excellence*, the hypnotic suited for typhus. Liebreich's theory is in itself beautiful and attractive, and in the words of a recent reviewer, "it is impossible not to feel a genuine admiration for the stroke of genius which is indicated in the prediction, from purely chemical considerations, that chloral would yield up chloroform to the blood in precisely the form in which it might be expected to do the maximum of good and the minimum of mischief." The illustration of the theory furnished by the rapid and magical effects of chloral in typhus involves an idea even more attractive. We transform a pathological into a therapeutic process. The fever-products liberate the soothing agent, and so calm the excitement which they themselves have made.

The subject of special susceptibility in typhus patients to the

influence of chloral, in reference to the theory of its action, is one which must be reserved for future investigation. But it is entirely confirmatory of my supposition to find that there is such a susceptibility. The chemical conditions on which, according to Liebreich, the physiological action of chloral depends, exist in typhus in excess. The physiological effects of chloral ought therefore to be developed in a typhus patient with smaller doses and with greater rapidity. My experiments are few, but they are all *positive in their result.* Liebreich states that *the nervous power of the heart is the last which suffers.* Richardson says—"In fatal cases the functions destroyed are: 1. The cerebral. 2. The voluntary muscular. 3. The respiratory. 4. *The heart.*" In my observation on *physiological action*, it will be seen that a dose so small as 40 grains in two out of three cases, proved toxic to the extent of developing the ultimate of the series of functional effects—that upon the heart; and that in one case even 20 grains seemed to produce this result, while the whole series of cases illustrates the striking facility with which small doses produce the primary effect on the brain and voluntary muscles, and sometimes lowers the frequency of the pulsations.—*Glasgow Medical Journal, Feb.* 1870, *p.* 209.

114.—ON THE ADMINISTRATION OF CHLOROFORM.

By the EDITOR OF THE LANCET.

[There having been lately an unusual number of deaths from chloroform, it becomes the duty of medical journalists to enquire what dangers are inseparable from its use, how far these may be obviated by special precautions, and within what limits as well as by what means the restoration of patients from conditions of peril may be hoped for.]

Taking, as the first condition of safety, the presence of a competent administrator, who shall attend to the anæsthesia alone, we may accept the rules that are generally observed with regard to preliminary abstinence, the administration of a stimulant, the loosening of the clothing, and the recumbent position. We lay no stress upon the kind of inhaler, except to observe that no inhaler will afford any security against the consequences of carelessness in its employment.

If we confine an animal in an atmosphere highly charged with chloroform, and watch the effect, we shall observe that, after the third stage is reached, the respiration becomes fainter and fainter, and presently ceases. If we then open the thorax, we find the lungs contracted and bloodless, the heart still beating. The vital function suspended is that of breathing, and all efforts to restore life must be directed to its re-establishment. *It*

follows that the breathing and pulse should be the points to which the attention of the chloroformist should be chiefly directed. If it begin to flag, the inhaler should be withdrawn, and air given. If it very speedily recover, the administration may be cautiously resumed, although there will probably be some cases in which a prudent man would decline to incur this risk. If it does not recover immediately, the patient may be very gently rolled over upon his left side. In this position, time will usually bring about recovery; and the position alone will do all that can be effected by drawing out the tongue, dashing cold water on the face, and flipping with a towel. If the change of position be followed by no improvement, or if the breathing should still fail, the next step is to endeavour to restore it by artificial means. How should this be done?

We had an opportunity this week of witnessing some experiments upon rabbits, by Dr. Richardson, which appear to show that, after apparent death from chloroform, any rough handling or compression of the chest or abdomen, destroys every chance of recovery, and renders those methods useless which might otherwise be employed successfully. The effect of such rough handling seems to be to paralyse the enfeebled heart, and to break another link in the chain of vital action. As a matter of precaution, therefore, it may be laid down as a rule that no attempt to procure artificial respiration by compression of the trunk should ever be made. The chief methods that remain are artificial inflation of the lungs, and excitation of the respiratory muscles by a current of induced electricity.

Inflation of the lungs was long ago advised by Dr. Snow, who suggested that it should be done from mouth to mouth. Dr. Richardson has lately contrived for the purpose a little double-action bellows, that can be procured for ten shillings, and can be worked by one hand. At the will of the operator they either exhaust or inflate; and they are furnished with a nozzle to be passed into one of the nostrils. In the case of a rabbit in which respiration had ceased, the nozzle is inserted, and the chest emptied of a portion of its chloroform-loaded air. Fresh air is then pumped in, and alternate exhaustion and inflation practised with much gentleness, until an effort at independent breathing is seen. The nozzle is then removed, and the further progress of the case is left to nature. In one experiment that we witnessed, the inflation was commenced about half a minute after the total cessation of breathing, and was continued for four minutes before any sign of life appeared. In a little while the creature was running about, and seeming none the worse for its adventures.—*Lancet, Jan.* 15, 1870, *p.* 90.

115.—MEMORANDA RESPECTING THE ADMINISTRATION OF CHLOROFORM.

Preliminaries.—1. Unless very feeble, the patient should fast for three hours before the inhalation.

2. Twenty minutes before the inhalation, a dose of brandy should be given in water—a teaspoonful to a child, one or two tablespoonfuls to an adult.

3. The patient should, whenever convenient, be wholly undressed, and, invariably, everything tight about the chest or neck should be removed.

4. If possible, let the patient be in the recumbent posture, and on his back. Let the chest and neck be well exposed. Whatever form of apparatus be used (a piece of lint, a handkerchief, and Skinner's inhaler, are perhaps among the best), there is little or no risk with the first inhalations; and the patient may be instructed "to draw full breaths." So soon as any effect is manifest, you must be more cautious. Watch carefully the respiratory movements, and the colour of the cheeks, lips, and eyes. When convenient, keep your finger on the wrist-pulse; but this is not essential. If the patient struggle much, proceed with increased caution.

Signs of Danger.—Lividity of Face.—Remove the chloroform, and let the patient have air. Open the mouth and draw out the tongue.

Stertorous Respiration.—Stop the chloroform, open the mouth, draw forward the tongue, and watch carefully.

Irregular Gasping Respiration.—Stop the chloroform, splash cold water on the face, and flip with the towel.

Feeble Pulse.—Proceed with great caution. If the feebleness amount to almost complete failure, stop the administration.

Death-like Pallor.—This, the most dangerous sign of all, must be met without a moment's loss of time. Flip with the wet towel on the cheeks, chest, abdomen, and limbs. Open the mouth, and if, as is usual, breathing has ceased, begin artificial respiration at once. With outspread palms, press the front of the chest forcibly down, whilst an assistant, at the same time, presses the abdomen. Make these movements not oftener than fifteen times in the minute. Air should be heard to enter the trachea. Whilst this is being done, let assistants continue most vigorously to flip the skin in all accessible positions—it cannot be done too much. If the collapse continue, let an ounce of brandy be injected into the rectum. Do not remit the artificial respiration until the patient is quite rallied. If the collapse persist, the efforts at rallying should be persevered with for an hour at least. If a large catheter be at hand, it may be well to introduce it into the trachea, and inflate the lungs by the mouth.

Remember that irregular inspiratory efforts may occur long after death in all other respects has apparently taken place. Do not be deceived by them, but continue your efforts.

Remarks.—The plan of artificial respiration recommended is, we believe, all things considered, the most convenient. The catheter in the trachea is, when practicable, the most effectual plan. Its introduction is not difficult. If the artificial inspirations be made too rapidly, they defeat their own object; nor should they be too forcibly made. If it be needful to continue them more than a few minutes, the operator will find it convenient to kneel astride the patient's trunk.

The administrator ought always to have with him brandy, an enema-syringe, and a large flexible catheter. He ought always, when convenient, to require his patient to be undressed, since it may be very desirable to have the surface accessible.

By "flipping with the towel," we mean twitching the corner of a damp towel in such a manner as to cause the sharpest pain possible. It is by far the most effectual method of awakening a chloroform patient, and should, in case of danger, be practised instanter, and at several parts at once. Its effect is to excite locally the capillary circulation, and indirectly to stimulate the respiratory muscles, and even the heart itself.—*British Medical Journal, Jan.* 1, 1870.

116.—SOME OBSERVATIONS RESPECTING THE INFLUENCE OF CHLOROFORM, &c., IN PROMOTING CUTANEOUS ABSORPTION.

By Dr. AUGUSTUS WALLER, F.R.S., of Geneva.

[Hitherto no very accurate ideas have been held by the profession as to the absorption by the skin of the different medicinal substances applied to it, as aconite, belladonna, &c. The dry condensed cuticle, and the oily secretion of the sebaceous follicles present great obstacles to rapid absorption.]

Mons. Parisot has made numerous observations on children and adults subjected to a prolonged immersion, varying from one to two hours, in baths containing strong proportions of cyanide or iodide of potassium, or an infusion of belladonna leaves. He states that in all these cases he was unable to detect the presence of the substance in solution, and that with belladonna there was in no instance any dilatation of the pupils.

It is very difficult to reconcile these negative results with those of Westrumb, Homolle, and others, who have detected in the saliva and urine, the presence of the above-mentioned salts after a prolonged immersion in a local bath containing them. It is very obvious that, for the settlement of these important

questions, we must appeal to the more delicate tests provided by the spectrometer, as in the observations of Dr. Bence Jones, who has shown what minute quantities of lithia may be detected in the various tissues of the body.

But if, instead of employing aqueous solutions, we place various alkaloids dissolved in chloroform in contact with the skin, we quickly obtain evident symptoms of the absorption of these agents, which may be carried to an extent sufficient to destroy life. When a mixture of equal parts of chloroform and tincture of aconite is maintained in contact with the human skin, it rapidly produces irritation and vascularisation, which, after augmenting during the first two or three minutes, subsides gradually, and the part becomes pale, and more or less insensible, with a local decrease of temperature. Still later the part becomes insensible to the prick of a needle, though it still retains an imperfect sensibility when pressed upon. In fact, the part is in a state of superficial paralysis, which does not extend to the deeper tissues. This state of anæsthesia will continue for several hours. The two principal agents producing it are chloroform and aconite. For if the former is used alone, a certain amount of insensibility may be obtained, but it is very imperfect and evanescent compared to that produced with the intervention of the tincture of aconite.

On the other hand, when the tincture of aconite is applied alone to the skin, it may be left undisturbed without producing either symptoms of irritation or absorption, such as are evidenced by hyperæsthesia in the first stage, or anæsthesia in the second stage of its action. In addition to the symptoms of anæsthesia, the mixture of aconite and chloroform is liable to produce vesication, and even a certain amount of ulceration of the cutis after having been maintained for a long time in contact with the skin. Besides these local symptoms of the absorption of aconite, there frequently exists others resulting from its general influence on the system, namely, slight nausea and a sense of depression.

On the lower animals the application of the same liquid is followed by similar local and general symptoms, which are more or less severe or fatal in proportion to the amount of surface of the skin exposed to the solution. For example, when a young guinea-pig has one of its feet dipped into the solution for about a quarter of an hour, the result is invariably fatal, as is shown by the following case:—

"After five minutes' immersion, the part exposed became reddened and warm: this was quickly succeeded by complete insensibility of the integument. The foot was dipped in the liquid for ten minutes longer, then washed and dried. Soon after the lips became pale, the general temperature decreased,

slight convulsions succeeded, accompanied by dyspnœa, frothing at the mouth, and efforts at vomiting, About three hours from the commencement of the experiment, all the above symptoms were much aggravated, and death speedily followed."

With a full-grown animal the results are the same, but it requires a much longer immersion to produce them. Similar results are obtained on the dog by the application of chloroform and aconite to the ear. Local insensibility is produced, followed by symptoms of poisoning, resembling those above-mentioned on the guinea-pig, which likewise terminate in the death of the animal.

As regards alcoholic solutions of aconite, the same negative evidences of their action are observed as on the human skin. But in order to study with greater precision the phenomena of absorption, either on the skin, or of any other part of the body, we must employ a means more precise and more capable of measurement than the above-mentioned symptoms. For this purpose I have been led to adopt in my investigations the albino rat. In this animal the pupils during daylight do not exceed one millimetre in diameter. They are less variable than those of most other animals, and, by the absence of black pigment in the iris and choroid, they are more easily measured. The return of the iris to its normal dimensions after its dilatation during the experiment allows us to follow the gradual elimination of the atropine from the system.

The *modus operandia* consists in maintaining one of the feet of the animal in the required solution, while the pupil is examined from time to time to recognise the moment it begins to dilate. We at once observe by this means the extreme influence which the vehicle or dissolving body exercises on the activity of absorption; for according as a chloroformic, alcoholic, or aqueous solution is employed, we may obtain dilatation of the pupil in two or three minutes, or perceive no effect after a prolonged immersion.

With a solution of atropine in chloroform of one per cent. of the alkaloid we generally obtain dilatation of the pupil in from two to five minutes. When once the dilatation has commenced, it rapidly progresses until it reaches its maximum. If after immersing the foot for a few seconds it is withdrawn, dilatation of the pupils is produced, although more slowly and less powerfully. The same is still the result if, after withdrawing the foot from the solution, it is carefully wiped and dried, showing how rapidly the atropine and chloroform penetrate into the substance of the skin.

With an alcoholic solution of the same strength as the above little or no effect is obtained after half an hour or an hour.

With a solution of atropine in water containing a few drops of acetic acid absorption is also very slow, generally producing no dilatation after thirty minutes. When withdrawn from the solution and exposed to the air, a slight dilatation of the pupil is obtained after a short time.

Extract of belladonna applied over the leg produced no dilatation at the end of an hour.

With a solution of strychnine and chloroform, dilatation of the pupils was observed at the end of three minutes. After five minutes slight convulsions about the larynx were observed, extending afterwards to the extremities, which were soon followed by tetanic convulsions, and finally by death.

An alcoholic solution of strychnia produced no symptoms whatever of the presence of strychnia after thirty-five minutes.

When the atropine is dissolved in a liquid consisting of equal parts of chloroform and alcohol, a considerable dilatation is observed after three minutes.

With one part of chloroform and four parts of alcohol, atropine produced dilatation at the end of nine minutes. With atropine dissolved in essence of turpentine, little or no dilatation was produced while the extremity remained in the liquid, but if after ten minutes' immersion it is removed, dilatation of the pupils commences at once and soon attains its maximum.

It is almost superfluous to remark that with chloroform alone dilatation is not produced.

On repeating my experiments with chloroform and atropine, Mons. Parisot obtained upon himself the same results as those I had already observed upon the lower animals. He states that, on applying over the forehead alcoholic and chloroformic solutions of atropine, a compress of cotton imbibed with the chloroformic solution produced heat, redness, and commencing dilatation of the pupils, nearly equal on both sides. With the alcoholic solution, no effect was obtained after two minutes' application, but after thirty minutes there was commencement of dilatation.

As far as regards myself, I have not been so successful as Mons. Parisot; and when we consider the small amount of surface exposed to the action of the topic, probably not $\frac{1}{500}$th part of the surface of the body, it would be remarkable if we could obtain the same results as those which I have described on animals, where the surface exposed is relatively so much greater, and equal to at least the tenth part of the surface of the animal. I can therefore only attribute the results of Mons. Parisot to some idiosyncrasy of an exceptional nature.

The foot of an albino rat was immersed in a solution of equal parts of tincture of opium and chloroform. After twelve minutes' immersion the limb was nearly insensible. After five

minutes' longer immersion there were symptoms of somnolency, which continued to increase. The eyes were dull. The animal started at any sudden blow on the table, and moved a few steps; when near the edge fell over. Pupils were contracted. Two hours afterwards the animal had nearly recovered.

After fourteen minutes' immersion in a mixture of equal parts of alcohol and a chloroformic solution of morphia, the skin of the part immersed was insensible, as in the case above-mentioned. The pupils were generally much contracted, the eyes half-closed and very dull. At the end of half an hour the animal had nearly recovered.

A small quantity of acetate of morphia was introduced by means of a coarse thread soaked in a solution of morphia in the proportion of two grains of the alkaloid to one drachm of chloroform. After the thread had been dried, it was introduced beneath the skin to the extent of about the third of an inch. Twenty minutes afterwards the animal became drowsy and gradually was narcotised, presenting all the symptoms mentioned in the previous instance.

When in a state of narcotism from opiates the pupils in the albino rat are generally contracted, but in some cases they are much dilated, contracting considerably whenever the animal is aroused by some strong irritation. This discrepancy is probably owing to the peculiar irritability of the retina and intolerance of light in this animal, for in other animals narcosis by opiates produces contraction of the pupil as on man.

With regard to the influence of alcohol when mixed with chloroform, we find that, instead of retarding, it rather accelerates absorption. Thus, with atropine dissolved in equal parts of chloroform and alcohol, the dilatation of the pupil is manifestly more speedy than with chloroform alone, being generally two minutes in advance of the latter on full-grown animals. With a mixture of three parts of alcohol to one of chloroform, absorption appears to be as active as when the proportion of chloroform is much greater.

The addition of astringents to a solution of atropine and chloroform has no influence in retarding the absorption of the atropine.

The principal conclusions from the foregoing experiments are:

1. Chloroformic solutions applied to the skin of man and animals are quickly absorbed, and produce local and general results according to the substances employed.
2. Alcoholic and aqueous solutions are either not at all or very slowly absorbed.
3. Chloroform easily traverses the dead skin by diffusion.
4. Alcohol does not traverse the skin, but produces an endosmotic current with water.

5. Skin exposed to chloroform in a state of liquid or vapour absorbs a considerable quantity of it.

6. On traversing the septal skin of the endosmometer, chloroform carries with it a certain amount of any alkaloid dissolved in it.

7. These observations sufficiently explain the rapidity of cutaneous absorption during life, without our having recourse to any problematic influence of sebaceous matter on the surface of the skin.—*Practitioner, Dec.* 1869, *p.* 329.

117.—ON THE USE OF NITROUS OXIDE GAS AS AN ANÆSTHETIC IN SURGERY, WITH COXETER'S LIQUID GAS.

By CHARLES JAMES FOX, Esq., Dental Surgeon to the Dental Hospital of London, and to the Great Northern Hospital.

It is difficult to witness daily the delight of those who, in my specialty, have experienced the relief afforded by the gas, and compare it with the torpid misery of those who have been relieved from their pain under the influence of chloroform, without feeling an almost irrepressible desire to see the comfort of the gas extended to those who have to undergo more severe operations. This must be my excuse for entering upon a field which might be more fitly occupied by some of those whose practice is more exclusively devoted to general surgery; but I am so impressed with the belief that this anæsthetic would, if properly and fairly tried in general surgery, prove an inestimable boon in thousands of cases, that I cannot refrain from endeavouring to turn the attention of medical men more earnestly to the subject. I am far from desiring to depreciate the value of chloroform; in many cases it will continue to be the only anæsthetic that can or may be used; and, if I may be allowed a short digression, I would add, that the rapidity with which a patient is anæsthetised by it is as much greater, and his recovery therefrom is as much more satisfactory, when Mr. Clover's apparatus is employed instead of any other mode of inhalation, as—so far as my experience goes—the effect of nitrous oxide is more satisfactory on both points, than that of chloroform by *any* mode of administration.

I should be very sorry to have it supposed from the above remarks that I do not believe it possible to have a fatal case with nitrous oxide. I should be rash indeed were I to advance any such opinion, and every additional case only makes me more cautious, more watchful, lest a fatality that may occur to any one of us, may fall to my lot; but as yet only one death has ever been *directly* ascribed to the use of the gas, and that

took place six years ago. In urging its adoption in general surgery, I am aware that I am largely increasing the chances of a fatal case occurring, not so much from the increase in the number of cases as from the fact that it will be more frequently given to patients whose diseased state renders them less able to encounter any such change from their normal condition, whether induced by chloroform or gas.

The reasons why I advocate the use of nitrous oxide in surgery are—

1st. Its safety.

2nd. The rapidity with which anæsthesia can be induced—viz., from 50 to 100 seconds.

3rd. The readiness with which a patient can either be kept for a prolonged period in the anæsthetic state, or, if the surgeon so wills, can be promptly and thoroughly awakened.

4th. Because it is actually pleasant to the patient to inhale, and, therefore, much fright and mental distress is avoided, diminishing the danger of death by syncope.

5th. Because the recovery is usually bright, pleasant, and complete, any after discomfort being extremely rare.

6th. Because sickness has never, to my knowledge, occurred during the administration of this anæsthetic, and but *rarely* afterwards.

First, then, as to its safety. As far as we can judge from statistics, up to the present time it is the safest anæsthetic in use; but then, with but few exceptions, it has only been used in short operations—such as the extraction of teeth. On the other hand, it must be borne in mind that many of the deaths from chloroform have occurred in just such cases, and, moreover, that when greater operations have been contemplated, death from chloroform has most frequently occurred in the first few minutes of inhalation. Nevertheless, until nitrous oxide has been extensively used in capital operations, I cannot plead more positively for its greater safety than I have already done, further than to repeat that, as far as it has been tried, it *has* proved the safest anæsthetic, and we have every right, upon the evidence before us, to trust it until the reverse is proved.

2nd. The rapidity with which anæsthesia can be induced, varying from a minute to a minute and a half, results in a great saving of time to an operator at an hospital, his colleagues, and the assembled students. Besides, all sense of consciousness to surrounding objects is most frequently lost in from thirty to sixty seconds, although not insensibility to pain; apart from the saving of time, surely this must be admitted to be an additional source of safety to the patient, inasmuch as a long period of nervous fright and terror is quickly passed over, and there is,

therefore, far less danger of that death from fright to which we so often hear allusions made when a fatal chloroform case occurs.

3rd. With regard to my third reason, it may happen that a patient is brought to the table for an injury to be painfully examined with bistoury and probe, with the understanding that possibly a severe operation may be the result. Should it happen, as it sometimes does, that the result is favourable, how preferable it is to be able to allow patients to wake up promptly to the pleasing intelligence, rather than that they should endure hours of depression and nausea for so simple a matter; on the other hand, should operation be determined upon, there is no difficuity in maintaining the anæsthesia.

4th. The fact that the gas is pleasant to inhale tends also very far to reassure a nervous patient. In over 15000 cases I have not met with more than three or four who professed to dislike the slightly sweetish taste of the gas, and the probability is, had they inhaled chloroform, this dislike would have been much more strongly expressed.

5th. The bright and rapid recovery, free from all unpleasant results, appears to me a great argument in favour of the gas. It often happens that short sharp operations have to be performed, which in themselves would not incapacitate patients from leaving the hospital at once; but, from the effects of chloroform, they are obliged to remain on a bed in the ward, sometimes for hours after, to the additional labour of nurses and the distress of their friends; whereas, if they have inhaled nitrous oxide, they are able at once to leave the hospital, feeling nothing worse than the smarting of the wound.

A singular case in evidence of the fact that no after ill-effects result from the gas I have permission to mention; it is that of M. Blondin, who on two occasions performed all his most difficult feats on the high rope, 400 feet long, within three hours after I had given him the gas for some extremely severe dental operations. If ever a clear head and steady nerves were needed so soon after an anæsthetic, it must be confessed his was a pretty severe test for them. That the gas is actually pleasant to patients I have been repeatedly assured by them, and those who have had chloroform often previously, have warmly declared their preference for the gas. I am speaking now especially of surgical cases.

6th. With reference to the sixth argument in favour of the gas, in many operations it is a very important one; but it is one that can only be maintained after a prolonged trial of the gas in severe operations. As yet I have never seen a patient become sick in the course of inhaling; only once I have known a patient express herself as feeling sick from nervousness, and she was actually so immediately the face-piece was applied. She told

me that the slightest unusual excitement brought on sickness with her. In the large number of cases that I have now seen I have only met with four cases of sickness after the operation, and the patients were all right directly they had been sick.

[Several reasons may be assigned for the fact of nitrous oxide gas not having come into favour as an anæsthetic in surgical cases, especially its milkiness, and the trouble and expense involved in fitting up an apparatus for its manufacture and storage. Subsequently Messrs. Barth supplied the gas compressed in iron bottles, containing fifteen gallons each, but as three of these were used in an operation lasting twenty minutes, the necessity of their being made to contain a larger quantity of gas was evident.]

At last, one night at the Medical Society of London, I saw the large bottles of compressed oxygen and hydrogen which were employed by Dr. Thudichum in his illustrations of spectral analysis. In them I saw—at least, for a time—the solution of the difficulty, and happily succeeded in convincing Messrs. Coxeter and Son that if these bottles could be filled in a similar manner with compressed nitrous oxide a great want would be partially met.

They at once set to work energetically in response to my appeal, as mentioned in my letter to the *Lancet* of Jan. 2nd, 1869, to supply us with the vessels containing respectively forty-five and ninety gallons of gas, which are now so well known. Still, although a great improvement, this was not yet sufficiently portable to win the support of the surgeon. For the dentist, who was always at home, it mattered little, but to the surgeon and the visiting anæsthetist it was everything. I never dropped the hope that liquid gas might be produced at a moderate cost, and never ceased to persecute Messrs. Coxeter on the subject: but they entered most zealously into my views, and on the 1st of November, 1869, I was requested by them to visit their office with Mr. Clover, to test the liquid gas. Finding it as efficient in its effects as what they had already supplied, they set to work with goodwill, and after months of labour, and at great cost, they have at last succeeded in producing a supply of liquid gas, from the first hundred gallon vessel of which I administered the gas with uniform success to several patients at the Dental Hospital of London on Monday, Feb. 21st, 1870.

The vessels in which the liquid gas is contained are of the same form and make as the large iron vessels hitherto used by Messrs. Coxeter, only differing in size.

They are made of wrought iron, and their weight and dimensions are as follows:—

Vessel A, to contain *one hundred gallons* of gas in the liquid state, is 12 inches long, 3¼ inches in diameter, and weighs 9 lb. 1 oz.

Vessel B, to contain *fifty gallons*, is 8½ inches long, 3 inches in diameter, and weighs 5 lb. 11 oz.

Vessel C, to contain *twenty-five gallons*, is 6 inches long, 2 inches in diameter, and weighs 3 lb. 5 oz.

A screw stopcock for controlling the exit of the gas is 2 inches long in each vessel.

Hence it will be seen that a good supply of gas, with apparatus complete, can be packed in a small portable case.

To each vessel, when in use, is attached what is commonly known as a Cattlin's bag, which, being about a foot in diameter, receives the first force of the liberated gas delivered through a small tube; and then from it the gas is inspired, with Mr. Clover's face-piece and two-wayed stopcock through a tube 1 inch in diameter.

The extraordinary degree in which the bulk of the gas is diminished by being liquefied will be better understood when I state that one of Mr. Coxeter's present 90-gallon bottles could by this process be made to contain 1000 gallons of gas.

There is one important advantage obtained by the use of this liquid gas, and that is the ability to ascertain to a nicety, after an operation, how much gas is still left in the bottle. The want of this was one of the many obstacles which prevented the gas from being much adopted by surgeons; but in this case each bottle is stamped with its weight when empty, and the difference at any time between the *actual* weight and that stamped on the vessel will give the quantity remaining in the vessel.

This may be readily calculated when we remember that, according to Dr. M'Adams's revised edition of Dr. Wilson's little work on "Inorganic Chemistry," published by Chambers, 100 cubic inches of the gas weighs 47·29 grains; and therefore 30 oz. by weight is equal to 100 gallons by measure, three-tenths of an ounce being equal to one gallon.

As to the quality and anæsthetic powers of this liquid gas, it is so far better than that kept in gasometers, that much less of the liquid gas is needed to produce anæsthesia, and I believe I may say the anæsthesia is more profound. I have long noticed this superiority of the compressed gas over the ordinary gas in gasometers, and I believe liquid gas is even more efficient than the compressed gas.

It has been suggested that there is some danger in the use of such a powerfully compressed gas. On this subject I cannot do better than quote the excellent remarks of Dr. Evans, of Paris, in his communication on liquid gas to the *British Journal of Dental Science*, in July, 1868:—

"Before dentists and surgeons will use the liquefied gas, they must first be assured of its safety. The idea of holding in the hand or carrying in the pocket a bottle within which there is an active bursting force of 750 lb. to the square inch, is certainly scarcely comfortable to a naturally timid man. But a consideration of the facts which bear upon this point will, I think, remove all apprehension, and cause everyone to feel that there can be little, if any, danger when the gas is confined in properly constructed bottles.

"A common glass eau-de-seltz bottle is charged under a pressure of about 100 lb. to the square inch. These bottles are not generally considered as dangerous. They are more likely to burst, however, than bronze bottles of similar form and thickness under ten times that pressure. A fowling-piece when discharged, is subjected to a bursting force of from 10,000 lb. to 15,000 lb. per square inch, or *twenty* times the bursting force of the liquid gas; these two very familiar facts are sufficient to show that there is relatively little danger to be apprehended from the gas."

I should occupy too much time were I to give any account of the physical properties of this truly wonderful liquid gas; moreover, it would be superfluous for me to do so. It is not a thing of to-day; it has been well known to chemists for years past, and full accounts of it may be found in the text-books on chemistry, but it has never yet been produced in any quantity, nor for any other purpose than for experiment or exhibition, until this moment, when we are indebted to the enterprise of Messrs. Coxeter and Son for a supply which will, I trust, only be limited by the demand.—*Lancet, April* 2 *and* 9, 1870, *pp.* 479, 516.

118.—ON RAPID GENERAL ANÆSTHESIA FOR SHORT OPERATIONS—METHYL-ETHYLIC ETHER.

By Dr. B. W. RICHARDSON, F.R.S.

The author made a communication to the Medical Society of London on the Production of rapid general Anæsthesia for short Operations; and at the same time introduced a new anæsthetic compound for that purpose. He began by explaining that, within the past two or three years, a practice had been followed of producing quick insensibility which should be followed by equally quick recovery. Two agents had been employed for this purpose: (*a*) nitrous oxide gas; (*b*) bichloride of methylene. Admitting that the principle of producing quick insensibility had a practical intention and usefulness, Dr. Richardson said he had an objection to the methods which, up to the present time, were adopted for carrying the principle into

practice. His objections to nitrous oxide gas were as firm as ever. He held still that the employment of an agent which excluded all atmospheric air during inhalation, which produced the most perfect asphyxia, which required for its administration costly and troublesome apparatus, and which if administered beyond a given period, even for a few seconds, must of necessity kill, was a bad agent for anæsthetic administration—was, in fact, a rude and vulgar process, retrogressive in science. Respecting bichloride of methylene, though it was hard to speak against any application of a remedy which he, the author, had introduced, he must be candid and say that he was not favourably impressed with the application of bichloride for *quick* general anæsthesia. That it was marvellously rapid in its action was true, that it answered the end had in view was true, and that it had now been used for rapid inhalation an immense number of times was also true; but these facts could not conceal the further and all-important fact that the bichloride of methylene belonged to a dangerous family of chemical substances, and could not therefore be played with without risk. It had been extolled as being safer than chloroform; and that was allowed, for, as it contained an equivalent of chlorine less than chloroform, it was materially safer. But the safety was relative, not absolute. Under these impressions the author was led recently to review experimentally the action of the whole of the more promising anæsthetic fluids and vapours, including chloride of methyl, bichloride of methylene, chloroform, amylene, hydride of methyl, ethylic ether, methylic ether, and some others, which were given on a table placed before the Society. The result was that he had decided in favour of methylic ether for rapid anæsthesia. The anæsthetic properties of methylic ether were first discovered by Dr. Richardson in 1867, and the substance has been reported upon by him in two reports to the British Association for the Advancement of Science. On the 20th of May, 1868, he inhaled it for the first time himself. Dr. Sedgwick and Mr. Peter Marshall administered it to him to complete insensibility. He was narcotised completely in one minute, was unconscious in seventy seconds, and recovered almost instantaneously without nausea, headache, or other unpleasant symptom. From that time the author has been in the habit of narcotising occasionally with methylic ether, and recently with marked success. The ether is made by digesting one part of pure methylic alcohol with two of strong sulphuric acid. The mixture is heated, and the methylic ether, which passes over as a gas, is subjected to frequent washings in a strong solution of potash. The ether remains as a gas even below zero; it has an ethereal odour; it is chemically an oxide of the radical methyl; and its vapour density is 23, taking hydrogen

as unity. The strongest objection to methylic ether is that it is a gas; but, happily, that difficulty is to a large extent overcome, the gas being very soluble in various substances; water takes up 37 volumes of the gas, yielding an ethereal fluid of a very pleasant taste; pure ethylic ether and alcohol take up over 100 volumes, and chloroform and bichloride of methylene nearly as much. For practical purposes, the author prefers absolute ethylic ether of specific gravity 720, and boiling point of 920° Fahr., as the solvent. The ether is charged with the gas at a temperature of 32° Fahr., and the compound is at once bottled and firmly corked down. It should be kept for a time before being used, the process of keeping producing a comparatively stable compound. In using this compound, which he proposes to call *methyl-ethylic ether*, the author at present employs the simple mouthpiece invented by Mr. Rendle, and made merely of leather. He is adding to this a reserve bag, in order to conserve the ether. From one to two drachms may be put into the inhaler for quick narcotisation. Dr. Richardson next described cases in which the methylic ether had been administered to the human subject for the extraction of teeth. In eleven cases, the whole operation, from commencement of the inhalation to the complete recovery, was under three minutes; in several cases, one minute was sufficient; while in two cases forty-five seconds sufficed. In no case was there spasm, syncope, or asphyxia during inhalation, or any after-nausea, and in all cases there was a semi-consciousness, so that the patients did what they were bade to do, remembered what had been done, and yet were not conscious of pain. The author next described the action of methyl-ethylic ether on the nervous centres, comparing it with chloroform and other anæsthetics containing chlorine. He showed that this ether produced no excitation of the nervous centres which supply the vascular system, as chloroform does, and that, consequently, there was absence of muscular spasm, of contraction of bloodvessels, and of syncope from fatal contraction of the heart. When it was carried to the extent of arresting life in the inferior animals, it produced death by paralysing the organic nervous centres. This extreme result was preceded by convulsive action similar to that which is seen in death from hemorrhage, the convulsion being due to the absence of arterialised blood in the muscles. So well, however, did the heart still retain its power, that in one case, in a lower warm-blooded animal, a guinea-pig, the respiration returned *spontaneously* in pure air, four minutes and forty-five seconds after it had ceased. No fact could more definitely speak in favour of the safety of the agent. In conclusion, the author said that as he had confined himself this time to rapid anæsthesia for short operations, his remarks must be taken as bearing on that sub-

ject only. He had introduced methyl-ethylic ether as the readiest and best agent he knew of for the purpose described. It was better than nitrous oxide gas, because it allowed air to be given with it, and did not asphyxiate. It was better than bichloride of methylene, because it did not produce muscular spasm and syncope. At the same time, he did not consider it as perfect, nor should he consider general anæsthesia perfected until he, or some other observer, should discover an agent that will destroy sensibility without interfering at all with organic muscular life, volitional power, or consciousness. Methylic ether approached this perfection, though it did not touch it, and it encouraged perseverance in experimental research.—*Lancet*, *April* 2, 1870, *p.* 483.

119.—NOTES ON THE SUBCUTANEOUS INJECTION OF MORPHIA.

By Dr. EDWARD T. WILSON, Cheltenham.

[Whichever salt of morphia is used it is of the utmost importance that the solvent be water, and water only. The solutions prepared with acetic acid, and neutralised as recommended by the Committee on Hypodermic Injection invariably cause smarting, and prolonged tenderness of the punctured part. A solution containing three grains of acetate of morphia to the drachm of water is very convenient. When the whole body is open for selection, the dorsal surface of the arm and forearm, and the outer side of the calf, are the best spots for injection, as being the least sensitive to pain.]

A fold of skin having being raised between the finger and thumb, the point should be introduced steadily and quickly—not by a sudden prick or corkscrew movement—taking care that the whole thickness of the skin is penetrated, and that cellular tissue has been reached. The injection of a large quantity of fluid beneath the skin is usually attended with an angry-looking swelling, which has seemed beneficial in relieving the pain and tension at the punctured part, and need give no alarm, provided the solvent employed is of an unirritating nature, and no air has entered with it.

On withdrawing the tube, however small the injection may have been, it is advisable to secure the puncture with a piece of court or other plaster. In this I find myself opposed to Dr. Anstie; but cases have occurred in my own practice where much of the solution has oozed out from lack of this simple precaution.

When introducing the fluid, especially in an untried case, it is of the utmost importance to inject slowly. As the morphia enters drop by drop, the results of each turn of the piston can

be noted on the pulse, the pupils, the stomach and the nervous system generally. The most deadly faints I have seen were undoubtedly caused by too rapid absorption of the narcotic, either from hurried injection or from the accidental injury (?) of lymphatics, which became inflamed, and resembled raised cords on the surface of the skin. In these latter cases the effects were invariably sudden and severe.

In first cases I have usually allowed from three to five minutes to each minim of the solution (gr. iij. ad ʒ j.), pausing at the first intimation of nausea, faintness, or marked alleviation of symptoms. With these precautions, I have never, in some thousands of injections, met with any ill effects that a glass of brandy-and-water did not quickly relieve.

The great importance of slow injection has been impressed on me more particularly by a case in which large quantities of morphia were used; and the first few drops, if rapidly introduced, invariably caused a nausea, which soon passed off; the large residuum could then be injected quickly and with safety; whereas an increase during the nausea would induce most threatening symptoms of prostration.

There are, however, cases of idiosyncrasy, and they must be borne in mind, where opium in any form and dose produces its depressing effects, to the exclusion of all others. A good instance of this kind occurs in Dr. Harley's admirable work on The Old Vegetable Neurotics, where one-seventh of a grain of morphia injected for neuralgia in an excitable woman aged 40, produced at forty minutes symptoms resembling intoxication; at two hours oppression of the chest, faintness, vomiting, irregular pulse, and other symptoms of intense depression, which did not go off for four hours; but, it is added, six drops of laudanum by the stomach had always made her faint and sick. Another case may be quoted from the Report of the Committee on Hypodermic Injection, where the injection of a quarter of a grain of morphia was followed in five minutes by sinking at the heart, inability to stand, and repeated attacks of syncope (without any pulse), with the most urgent symptoms of prostration, which were only relieved by stimulants and galvanism. Unfortunately the rate at which the injections were made is not noted in either instance.

It is impossible to judge, without a trial in each individual case, whether the excitant or depressing effects of morphia will predominate; and so strongly impressed is Dr. Harley by the dangerous uncertainty in first injections, that he considers morphia should never be injected alone, unless there is reason to know that the patient will experience no ill effects. It should always, in his opinion, be combined with one-ninety-sixth of a grain of

sulphate of atropia, which he has found to counteract the depressant and nauseating effects of the simple drug.

My own experience of this combination is, as yet, too limited to enable me to speak with confidence on the point; but in one case where it was tried, even the one-ninety-sixth of a grain of sulphate of atropia produced such dryness of the fauces, and general irritability of the nervous system, that it had to be discontinued. There was probably some peculiar susceptibility to the action of belladonna, for one-fortieth of a grain injected on a previous occasion had produced most violent delirium, and distressing feelings of suffocation and oppression.

The excitant action of morphia has been shown to be more frequent in women than in men, and it will be well to act always on this presumption.

Dose.—The initial dose must of course be graduated according to the individual and the nature of the disease; but it appears to have been dangerously large in most of the recorded cases—a quarter, a third, one, and even two grains are spoken of; and it is little wonder that depressing and even fatal consequences have been the result in some instances. My own experience leads me to agree entirely with Dr. Anstie, that a quarter of a grain of morphia is, as a rule, an unsafe dose to commence with. In a neuralgic case, given by Mr. F. Woodhouse Braine (Medical Times and Gazette. Jan. 4, 1867), one-third of a grain of morphia injected over the insertion of the deltoïd caused dangerous symptoms in fifteen seconds; no mention is made of the rate of injection. In a case of mania, half a grain proved fatal; and a similar dose narcotised another patient for four days. Dangerous symptoms have also been found to follow the injection of a quarter of a grain.

After-effects.—The period of absorption is stated by the Committee on Hypodermic Injection to be from four to ten minutes; but it is often much shorter. One case has been mentioned above, in which symptoms followed in fifteen seconds; and I have found that commencing relief from pain is usually perceived in three minutes, if a sufficient quantity of the drug has been introduced at once. On the other hand, after repeated injections, the matting of the cellular tissue may so far impede absorption that the effects are not perceptible under at least half an hour.

Setting aside the choice of methods, and confining our attention to the hypodermic injection, what are the indications for its use, and what for avoiding it? There are perhaps few cases of pain where it cannot be used tentatively in the way I have described; but reliable data on this point are sadly wanting, and those who have had most experience will consider well before introducing morphia where pain is referred to the brain

or its membranes. There are undoubtedly cases in which its administration is fraught with the most imminent danger, and a death immediately succeeding the injection is regarded with much suspicion by the friends of the patient. The condition of the brain, as ascertained by symptoms, must in general decide whether morphia is to be withheld or injected; and there are probably few who would venture where inflammation or congestion of the brain had been made out to exist.

Charles Hunter recommends it in acute mania and insomnia generally. Dr. Lockhart Robertson has used half a grain of morphia every four hours with advantage in cases of acute asthenic mania, and one grain for an initial injection in melancholia.

Dr. E. Fox, of Bristol, has used one grain five times daily for weeks in the same disease. Delirium tremens has been treated successfully; and in the spanæmic condition of brain found in epileptics the morphia acts like a charm, subduing the pain of epileptic neuralgia, and postponing, if not preventing, a convulsive seizure.

The wiry pulse at the wrist and in the carotids becomes soft and full, and the painful feeling of constriction about the glottis is at once relieved.

In sea-sickness and in the sickness of pregnancy, the injection of morphia has given great relief. I have also found it useful in checking the violent retching and pain of a bilious attack, whilst other remedies were acting more immediately on the offending organs. Violent and distressing hiccough, which had lasted for more than twenty minutes, was at once stopped by a small quantity of morphia.

From the known action of opium, much benefit would naturally be expected from the injection of morphia in painful spasm, whether of the bowels, the ureters, or the gall-ducts. In colic, intussusception of the gut, passage of gall-stones, and of calculous matter from the kidney, relief is usually prompt and effectual. One case of the latter I may mention. A gentleman was seized with rigor, nausea, and intense lumbar pain, just as he was about to sit down at a dinner-party. Morphia and a syringe were fortunately at hand, and one-fifth of a grain was at once injected into the forearm. Complete relief followed in three minutes; the patient ate a hearty dinner, passed a comfortable evening in the drawing-room, and I promised to call and see him next day. In the morning he had slept well, felt perfectly comfortable, and produced with evident satisfaction a small calculus (mulberry with phosphatic shell) which had passed with the morning urine.

For neuralgias generally, tic, lumbago, sciatica, the injection of morphia is now all but a specific. Relief is always speedy,

and not seldom permanent. Possibly, in cases of this class, the addition of atropine to the morphia, as recommended by Dr. Harley, may increase the chances of a permanent cure.

A paroxysm of gout has been relieved in Dr. Leavitt's hands by one-third of a grain of morphia. So also have the lancinating pains of acute pleurisy. I have found it of great temporary benefit in painful rheumatic joints (chronic), and where calculus has been impacted in the kidney. Rest and ease, though it be but temporary, are no mean results to promise a worn and enfeebled sufferer; but where all hope of cure is past, and our only endeavour is

> "To ease the victim no device can save,
> And smoothe the stormy passage to the grave,"

in scirrhus of the breast or of the uterus, no alleviation is at once so certain, so lasting, and so welcome, as that derived from the subcutaneous injection of morphia.

The superiority of injection over administration by the mouth is nowhere more marked than in those cases where prolonged suffering necessitates the constant use of morphia over months or years. In the case of epileptic neuralgia before alluded to, in which, for two years and eight months past, almost every respite from pain has been won by morphia, subcutaneously injected, the only real inconvenience, and that of recent date, is a troublesome constipation, due probably as much to the torpid habits and heated rooms in which life is passed as to the special action of the drug.

In conclusion, I will venture to repeat three points on which, insignificant though they seem, I should wish to lay special stress:

1. That the solvent for the morphia should be distilled water without any admixture of acid.
2. That the initial dose should be much smaller than that usually given.
3. That the injection should be performed slowly.

With these precautions, morphia may be introduced into the system safely, and for indefinite periods, with but slight disturbance of the bodily functions.

I cannot close this very imperfect notice of morphia injection without expressing my opinion that the subcutaneous exhibition of drugs is the greatest boon given to medicine since the discovery of chloroform; and, judging from some experience as far as morphia is concerned, I would part with every drug in the pharmacopœia sooner than relinquish a power of relieving pain at once so prompt, so safe, and so easy of application.—*St. George's Hospital Reports, Vol.* iv, 1869, *p.* 19.

120.—SOME CASES IN WHICH THE HYPODERMIC INJECTION OF MORPHIA WAS EMPLOYED WITH GOOD RESULTS.

By Dr. JOHN BARCLAY, Banff.

Case of large umbilical hernia, reducible; but obstruction of the bowels, pain, and obstinate vomiting.—July 4th, 1868. Mrs. J., aged 64, has had an umbilical hernia for twenty-two years. She has had six children, the youngest of whom is now twenty-three years of age. She says the rupture began one year after her last labour without any known cause, and from being at first of the size of a marble, the tumour gradually increased in bulk until it is now as large as an adult head. It has often caused her much pain and sickness. It is always easily reduced when in the supine position; but immediately on resuming the erect posture, or withdrawing pressure, the mass of intestine again protrudes. On July 2nd she had been vomiting all day, but had no pain. Yesterday, July 3rd, she experienced a sudden and severe pain in the swelling, followed by sickness and persistent vomiting. For three days before this her bowels had not been moved. Pulse small and quick; urine scanty and high-coloured; great thirst; tongue dry and brown. Dr. Manson saw her to-day, and ordered sulphate of magnesia with magnesia mixture every two hours till the bowels should be freely opened, and pills, containing each a grain and a half of opium, every four hours, if necessary, to relieve the pain; mustard also to be applied smartly over the stomach, and warm fomentations. But neither the mixture nor the pills remained on the stomach.

July 5th. Ordered copious purgative enemata, which were twice given without relief to the symptoms. On the evening of this day eighteen minims of the solution of morphia were injected under the skin over the stomach, and an ounce and a half of castor-oil ordered to be given half an hour after.

July 6th. The castor-oil was taken at half-past seven yesterday evening, and was not vomited. All pains disappeared in twenty minutes after the morphia was injected, and there was no more vomiting till about half-past two this morning, and even then all that came up was a mouthful of mucus. The oil operated at nine o'clock this morning freely, and the dejecta were very offensive.

10 p.m. Since the purging began she has been once or twice somewhat sick, but has not vomited anything unless a mouthful of ginger beer, part of a too free draught of that beverage. Pulse 72, regular; skin warm and moist; feels much better, but weak; no pain; the edges of the tongue cleaning, its centre still covered with a brown fur. Has a good deal of thirst; urine copious and clear. Ordered ice and effervescing drink, and perfect rest.

July 7th. Has some pain to-day, but no vomiting; bowels have been once freely opened; urine copious and clear. I, however, injected twenty minims of the morphia solution.

July 8th. Feels much better to-day; no pain; has slept well; no vomiting; bowels have been freely opened. Pulse 72; skin cool and moist; urine clear; tongue much cleaner; appetite returning. As there is some thirst, to continue the effervescing mixture.

July 9th. Feels quite recovered.

The above case shows how rapidly and completely successful the hypodermic treatment was in subduing the pain and vomiting, and allowing a full dose of castor-oil to remain on the stomach and exert its laxative effect. Previous to injecting the morphia it was impossible to get anything to remain on the stomach in the shape either of food or medicine. In the greater number of cases of obstinate vomiting, either the calomel and opium pill or the magnesia and sulphate of magnesia mixture, acts as a charm in combating this symptom. Here, however, they failed.

Obstructed bowels; great pain; constant vomiting; failure of various remedies for six days; success of the morphia injection.—Sept. 23, 1867. E. W., unmarried, aged 24, had, on the evening of the 21st, taken a smart dose of senna and salts, which had operated powerfully during that night and all next day down to six o'clock p.m. On the afternoon of the 23rd she was suddenly seized with severe pain in the abdomen, a little above the navel, accompanied with retching and vomiting. She seemed in great agony; her pulse small, and 96 per minute. I ordered a pill, containing a grain and a half of opium, every four hours till relieved, and a plaister, composed of extract of opium and mercurial ointment, a drachm to the ounce, to be applied over the belly, and a light poultice over all.

Sept. 24th. Vomiting continues as severe as before; pain very little relieved; pulse 120, small; great thirst; urine scanty and red; no movement of the bowels since the evening of the 22nd. Ordered ice to be swallowed, the ointment plaister to be renewed on the belly, laudanum enemata, and nourishment to be given in small but frequent quantities.

Sept. 25th. Symptoms remain as observed yesterday; pulse 125, small; pain very little relieved; vomiting as severe as before; urine scanty. Ordered a calomel and opium pill every four hours, and laudanum enemata.

Sept. 26th. Symptoms very urgent, indeed; patient seems much worse; tongue and teeth covered with sordes; pulse 130, small; no movement of the bowels; great pain in the abdomen; vomiting of green bile incessant. Ordered the calomel and opium pills to be continued, strong purgative enemata to be

administered, and repeated at intervals, and a blister to be applied over the belly.

Sept. 27. Patient much in the same state as yesterday; pain very severe; vomiting still the same; nothing was brought away by the enemata. At a consultation to-day, Dr. Manson recommended a trial of the sulphate of magnesia and magnesia mixture, which was accordingly ordered.

9 p.m. No improvement; the blister which had risen well, did not relieve the pain or vomiting. The mixture was vomited every time. No movement of the bowels. To persevere with the purgative enemata, iced champagne, and jelly of beef.

Sept. 28th. Much in the same state as yesterday.

Sept. 29th. Still no improvement; seems in a hopeless state; pulse 130, and very small; countenance pinched and anxious: intense thirst; great pain in the belly; no movement of the bowels; vomiting as severe as ever; has kept nothing whatever on the stomach; urine very small in quantity, and red. It now occurred to me to try the effect of the hypodermic injection of morphia in the skin over the stomach, fancying it might produce not only a general sedative effect and relief from pain, but perhaps a local one, also, on the muscles concerned in the act of vomiting, and on the peristaltic action of the intestines. Accordingly, I sent for the syringe and injected fifteen minims of the solution over the stomach, and gave orders that in about three-quarters of an hour after, when probably the full effect of the morphia would be set up, a draught of warm castor-oil and laudanum, an ounce of the one and fifteen drops of the other, should be given, and if vomited to be repeated immediately.

10 p.m. To my great surprise, I was told that the hypodermic injection had had the desired effect. The pain was relieved in a few minutes, and there was no vomiting; the castor-oil was given at the proper time, and it also had stayed on the stomach, and had operated twice easily. There had been no vomiting since. She feels better in every way, only extremely weak. Pulse 120. To continue the iced champagne, beef-tea, and milk, to observe perfect quiet, and to have a repetition of the morphia injection if either the pain or vomiting should return.

Sept. 30th. Still improving; the pain has ceased almost entirely, and there has been no vomiting. To inject the morphia at bed-time to-night, as she said she did not last night sleep very well.

Oct. 1st. Going on well.

From this time she recovered slowly, but steadily. The morphia after last report was injected twice at bed-time, and then it was omitted, and bromide of potassium given instead. She enjoyed good health up to the present time (May, 1869), never having had any return of the attacks. Now, however, she

complains of cough, accompanied with slight hæmoptysis, and on examination tubercular deposit is easily detected at the apices of the lungs.

Now, as in the case first detailed, so in this, nothing could have been more marked than its extreme urgency, and the inefficacy of all the remedies prescribed; and nothing could have been more apparent than the immediate improvement after the injection of the morphia. The two most urgent symptoms, the pain and the vomiting, were almost instantaneously relieved, and the stomach was, as it were, compelled to tolerate the presence of the castor-oil until it passed into the bowels and produced its laxative effect.

Obstructed bowels, accompanied with intense pain and vomiting.—This case, which I shall describe shortly, was pretty much like that just detailed. I was called up at midnight on the 27th April, 1868, to go and see Mrs. B., aged 33, who was said to be dying. I went, and found her in a state of perfect collapse; no pulse could be felt at the wrist; the skin cold and pale. She complained of intense pain, which had come on suddenly, all over the belly, and she had vomited once. Bowels had not been opened for three days. Being six miles from any apothecary, and finding a phial of chlorodyne in the house, I gave her twenty-five drops in a little water, and ordered it to be repeated if vomited immediately, and in two hours if the pain should be unrelieved. I ordered, also, calomel and opium pills, which were to be given, if necessary, when they were procured, one every four hours; an opium plaister to be spread over the belly, and a poultice over it; also, plenty of external warmth.

April 28th. Has rallied a good deal, but has vomited everything, and complains of the pain being severe, especially so in the hypogastric region. Pulse 115, pretty full; bowels have not been opened; urine scanty and high-coloured; tongue dry and glazed; great thirst; severe headache. I injected fifteen minims of the morphia solution over the part where the pain was complained of, and ordered a black draught to be given an hour after.

April 29th. The pain which was immediately relieved on the injecting of the morphia, has not returned and there has been no vomiting since the draught operated twice, bringing away copious offensive dejecta. Feels much better. Pulse has fallen to 72. Ordered the morphia to be injected again if the pain or vomiting should return.

May 1st. Has not required the morphia; feels pretty well, but weaker, and has no appetite. Has not slept well during the last two nights, and still complains of some headache.

Ordered bromide of potassium and tincture of hops before dinner and at bed-time.

May 10th. Feels now quite well.

This case also showed symptoms of great severity, which were very speedily relieved by the hypodermic injection. During the past six years I have employed this method many hundred times, and almost always with the best results. The above cases show how valuable it is in angina pectoris, and in obstruction of the bowels, accompanied with severe abdominal pain and vomiting. And every day experience shows how good results can be obtained from its employment in rheumatism, both acute and chronic, lumbago, sciatica, insomnia, mania, melancholia, neuralgia, delirium tremens, threatened abortion, in various departments of midwifery, &c. The only remedies I have used hypodermically have been morphia, atropia, and caffeine. Atropia is a powerful and effective remedy in many cases, but not so safe nor so pleasant as morphia, which possesses nearly all the advantages of the other. I tried caffeine in one or two cases, but was disappointed in it. In one patient, suffering from insomnia, it produced intense sickness, and had no effect in relieving the sleeplessness. In another I gave it where much pain was complained of, without affording any marked relief. The dose I gave in both cases was one grain, as recommended by Dr. Anstie, in a paper published by him in the *Practitioner* for July, 1868.—*Medical Press and Circular, Dec.* 29, 1869, *p.* 509.

121.—NOTES ON APOMORPHIA.

By Dr. F. M. Pierce.

In the present communication, my object is to draw attention to the valuable properties possessed by apomorphia. By the kindness of my friend Mr. C. R. Wright, B.Sc., I was enabled, soon after the discovery of apomorphia by Messrs. Matthiessen and Wright, to make some investigations into its value in practical medicine. A detailed account of apomorphia will be found in the Proceedings of the Royal Society for 1869. It may suffice here to state that apomorphia is obtained by subjecting morphia to the continued action of pure hydrochloric acid at a high temperature for several hours. The base can be obtained from the resulting hydrochlorate of apomorphia, by dissolving in water, adding excess of bicarbonate of sodium, and extracting with ether or chloroform. In composition, apomorphia is morphia, *minus* an atom of water. In its chemical reaction, it is in nearly all respects different from morphia. It is soluble in cold, and to a greater extent in warm, water. In powder, it is of a snow-white

colour. The watery solution is colourless at first, rapidly changing to a dark olive-green, and, at the end of a few weeks, almost black. The cause of this evident decomposition is at present *sub judice*. Morphia is not reproduced. The physiological effects of the coloured solution are the same, to a slightly diminished extent, as of the fresh preparation, but rather more irritating to the skin. An increase of the dose is, therefore, required on repetition.

Briefly to indicate its therapeutic value, the chief character of the drug—its power of producing vomiting—was noticed to a very disagreeable extent during its preparation. Its absorption through the cutaneous surface produced in the manipulators lassitude, weakness, frequent headache, constant nausea, and occasional sudden attacks of vomiting. From some experiments made by Dr. Gee, one-tenth of a grain was considered the average dose for an adult. I have found this too large, whether of a fresh or an old solution. The desired effect is readily obtained with one-fifteenth of a grain, or less; vomiting occurring in from five to twelve minutes, and the subsequent depression being slight and of short duration.

The solution which I have generally used consisted of a grain of hydrochlorate of apomorphia (the base being very unstable), dissolved in two hundred minims of water. Five minims of this preparation, or one-fortieth of a grain, was the dose generally administered to children, to whom I have frequently given it as an emetic. In nearly all the cases, it was administered subcutaneously. In private practice, the hypodermic use of drugs may appear a little formidable; but the more complete control of a drug thus acquired will probably in time outbalance the objections to this method.

In illustration of the action of apomorphia, I append one case.

W. B., aged 8, residing at Kingston-on-Thames, came under my notice suffering from well-marked chorea. He was an intelligent, well-made boy, of sanguine temperament, the youngest of three. His father died of some strumous affection. The mother works much at her needle; she is nervous, but healthy. The patient's symptoms followed a severe scald of the chest when 5 years of age. At first, he was simply considered fidgety. Four months before I saw him, he had rheumatic fever. The twitches had increased very much since. The parts most affected were the muscles of the face, especially of the mouth (he could not protrude the tongue readily, nor keep it still when protruded), the muscles of the neck, arms, and trunk. The legs were least affected. A slight systolic *bruit* was audible at the apex of the heart. He had no worms. Three days after I first saw him, I injected one-fortieth of a grain of hydrochlorate of apomorphia into the left arm. The pulse before the injection was 70, regular, weak;

temperature and pupils normal. He did not complain of approaching nausea, but suddenly vomited at the expiration of six minutes and a half; and, fifteen minutes later, he again vomited. The pulse, nine minutes after the first vomit, was 100, weak; the temperature was not affected to any noteworthy extent. He felt a very slight drowsiness, lasting only a few minutes. He did not sleep, but returned to play. The involuntary movements were markedly better next day; they were less sudden, frequent, and complete. He could stand for two or three minutes almost quiet. At the end of three days, during which period his improvement was maintained, the fortieth of a grain of apomorphia was again injected. Previously to injection, the pulse was noted as being 76, irregular, weak; the temperature 98·9; the pupils normal. The muscles of the neck and left arm were still very much affected. Vomiting ensued, without premonitory symptoms, in fifteen minutes. The pulse was 88; the temperature-variation unimportant. The pupils were slightly dilated. He did not feel any sleepiness, and, after a few minutes' rest, felt quite well. The chorea was much diminished after this; and, ten days later, I injected one-thirty-third of a grain in the arm. The pulse was previously noted 80, regular; pupils normal; &c. Vomiting occurred suddenly at the end of ten minutes; the pulse counting 90; the pupils dilated a little. He was discharged quite recovered soon afterwards, not having had any choreic movements for the last eight or nine days. No other treatment was adopted.

In two other cases of chorea, the action of apomorphia was beneficial, though not as distinctly as in the above case, and indeed, not more so than many of the vaunted remedies for chorea. It does not seem to have any specific action. It is only as an emetic that I would draw attention to it. With this object, I have used it at the commencement of pneumonia; to relieve the throat of exudation in diphtheria; in scarlatina, &c.; in cases of poisoning; and in drunkenness. As an emetic, it is depressant, but not to a dangerous extent. Though, in the example given, slight drowsiness was observed on one occasion after its use, it has not been a constant accompaniment, but the exception. The feebler the preparation, the less was this noticed. In both adults and children, with a dose not exceeding one-fifteenth of a grain, very slight inconvenience followed. The alterations of the temperature and respiration were so slight that they may be disregarded. The pulse was not peculiarly affected. The pupils were generally a little dilated. No action on the bowels or kidneys was observed.

Apomorphia is peculiar in the sudden accession of the vomit. The usual premonitory signs and symptoms are wanting, or all but coincident with the expulsive effort. The first attack of

vomiting is sometimes succeeded by another, after a few minutes' interval, the patient quickly recovering from the temporary disturbance. Most frequently, the single vomit is short and final.

The occasional occurrence of sudden vomiting after the administration of morphia, subcutaneously or by mouth, may perhaps be due to the presence of this body—apomorphia—as a product of partial decomposition. Should further investigation complete the chain of chemical analysis and synthesis of the morphia salts, some very instructive chemical and physiological results may be obtained.

In conclusion: as an emetic, apomorphia is pre-eminent in the smallness of the dose required; the certainty, rapidity, and completeness of its action; the unimportance of its baneful effects; and its non-irritating character. It contrasts most favourably with the old-fashioned emetics. The only drawback at present is its costliness; but, no doubt, in a little time it will, as well as chloral, come within the reach of the most economical practitioner.—*British Medical Journal, Feb.* 26, 1870, *p.* 204.

122.—POISONING BY TINCTURE OF ACONITE SUCCESSFULLY TREATED BY HYPODERMIC INJECTIONS OF LIQUOR AMMONIÆ.

By B. Wills Richardson, Esq., Examiner in the Royal College of Surgeons, Ireland, and Surgeon to the Adelaide Hospital, Dublin.

[The treatment pursued in the following case was of course suggested by its successful employment in cases of snake poisoning, as suggested by Professor Halford. We may remark that Professor Halford disapproves of merely throwing the injection under the skin, and recommends its being thrown directly into a vein. The liquor ammoniæ used in this case was not diluted, as it was not found to be a very strong preparation.]

On Thursday evening, Nov. 12, 1869, I received an urgent message to visit Miss B., aged 25 years, who, while suffering from severe facial neuralgia, swallowed through mistake, instead of a tonic mixture, two tablespoonfuls of an aconite mouth lotion.

The mixture and the lotion being upon the dressing-table, Miss B., in the hurry to get out for some shopping, swallowed, just after breakfast, two tablespoonfuls of the lotion, instead of an equivalent dose of the mixture, her mouth being at the time benumbed by a previous use of the lotion as such.

The mistake was made at 11 o'clock a.m. A cup of tea was next taken by her, and she left home in a few minutes. Several shops were visited on her way to the house where she intended to make most of her purchases, so that the latter was not reached until half-past twelve o'clock p.m. She had barely entered it when she became "alarmingly ill, staggered on attempting to walk, and was seized with a fearful benumbed tingling in the lower half of the back, then in the face and head, while at the same time the tingling in the mouth became more developed. The head felt as if it were distorted by the pressure of a vice, and a sensation of tightness across the nose and eyes was most distressing. In a few minutes more, the legs became so weak, and such tremor came over her, that she could not stand without assistance. She was conveyed immediately to the house of an acquaintance in the neighbourhood, her friends being under the impression that she was too prostrate for the drive home, a much longer distance. She was placed upon a sofa. The debility had become so great that she fainted on three or four occasions in attempting to sit up. Benumbed tingling of both the upper and lower extremities commenced at half-past one o'clock p.m., and vision became very imperfect, a blackness, as she described it, having come over the sight. A little time afterwards, vomiting of an olive yellow-coloured fluid commenced, and was almost incessant up to seven o'clock p.m. Towards evening she was greatly collapsed, and having fainted when in this state, her friends fancied that she had expired."

Before I saw her she had been given brandy repeatedly, as well as acidulated drinks; but they were vomited as soon as they reached the stomach. Warm jars, also, were applied to the feet, and additional warm clothing was placed over her. There was no indication of mental aberration, and the bowels were undisturbed. I arrived at fifteen minutes to seven o'clock p.m. and found her in a most perilous state. The face was pallid, the pupils were largely dilated, and the extremities of icy coldness. Vomiting was almost constant, and loud eructations were frequent. She had, as she expressed herself, "a dreadful benumbed tingling in the legs, arms, head, face, and in the mouth, the head feeling as if it were compressed by a vice." The pulse was felt with difficulty at the wrists, and the heart's action was weak and irregular. I gave her immediately some warm brandy punch, and, in a few minutes afterwards, a mixture composed of aromatic spirit of ammonia, sulphuric ether, tincture of ginger, and camphor mixture. A sinapism was placed over the heart, and one upon the calf of each leg. The punch and the mixture were not retained upon the stomach.

She was pulseless at ten minutes to seven o'clock, and the extremities were cold as death. The pupils were much dilated. The intellect continued unimpaired.

It being obvious to my mind that death at the heart had commenced, I resolved to inject hypodermically twenty-five drops of liq. ammoniæ; but as the time that would be required to procure my own syringe might be a fatal loss to the patient, I sent to a neighbouring cutler, who was kind enough to send me one in a few minutes.

7 o'clock p.m.: I injected half a drachm of liq. ammoniæ under the skin, corresponding to the insertion of the right deltoid muscle.

7.10: Vomiting not so frequent; but the stomach will not tolerate the stimulants. She continues collapsed and very cold; forehead covered with sweat, eyes glassy, and pupils are much dilated; tongue pale and contracted; no trace of pulse at the wrists; intellect unimpaired. Injected half a drachm of liq. ammoniæ under the skin of the outside of the right arm, about midway between the elbow and seat of the first injection.

7.20: Vomiting at longer intervals; still pulseless at the writs, and no sign of return of warmth in the extremities; complains constantly of the compressed and distorted feeling of the head; pupils have continued of the same size. Injected half a drachm of liq. ammoniæ under the skin of left infra-scapular region.

7.25: Pulseless. Injected half a drachm of liq. ammoniæ under the skin a little below the middle of the outer part of the left arm.

7.30: While my fingers were applied over the course of the radial artery, at the wrist, searching for a pulsation, I fancied I felt a weak, irregular, thready beating of the vessel. In a few minutes this became no longer doubtful, but gradually stronger and stronger.

8 o'clock: Pulse fully established, but a little irregular; vomiting has almost ceased; extremities warming; tingling of the skin and compressed sensation of the head and face no longer felt. The tingling, however, of the extremities, although not so decided, did not cease until half-past twelve o'clock next morning; and that of the lower lip continued until November 28.

In cases in which death is to all appearance impending, I should not like to lose time in trying to limit the injection to the vein, as suggested by Professor Halford, and would rather take the chance of a sufficient quantity of the ammonia being absorbed from the areolar tissue before its local action takes place, the chief objection to this procedure. Of the four injections made under the skin in Miss B.'s case, but one caused subsequent annoyance, the cutaneous eschar that resulted from it

being about the size of one of our new halfpennies. There being no doubt that the symptoms were caused by tincture of aconite, the important matter to ascertain was the quantity that had been taken. I therefore made the necessary inquiries on the point, and learned that the lotion, if made according to the directions for compounding it, should have contained one drachm and a half of the tincture in every fluid ounce. Of this lotion Miss B. took two tablespoonfuls, as already mentioned.

Whether or not the late appearance of the symptoms was owing to the tincture being a weak preparation, or to the fact that it had been taken immediately after breakfast, or even to some peculiar idiosyncrasy, are matters for conjecture. At all events, when they were established, they were of the most alarming nature, and portended approaching death.

Although I am fully sensible of the wonderful assistance nature renders to our art, nevertheless I believe that if she had not been herself assisted in this case, she would have failed in maintaining life sufficiently long to allow the influence of the aconite to pass away.

When we consider that none of the stimulants given by the mouth were retained upon the stomach—that Miss B. was almost pulseless at a quarter to seven o'clock, and pulseless at ten minutes to seven o'clock, and continued to be so until about half-past seven o'clock—and that during these forty-five minutes she became weaker and weaker, colder and colder—the saving of her life may, I think, be fairly attributed to the ammonia subcutaneous injections, and for the following reasons:—1. The vomiting, which had been almost incessant, up to the moment of the first injection, commenced to lessen in frequency immediately after it, and nearly ceased after the fourth; 2. The disappearance of the pulse from the wrists at ten minutes to seven o'clock, and its reappearance after the fourth injection; 3. And because none of the stimulants that had been given by the mouth were retained upon the stomach, any influence they may have exerted when descending to this viscus, and for the few moments they were in it, not being sufficient to prevent the progressive failure of the circulation.

In addition to the varieties of poisoning for which Professor Halford has recommended liq. ammoniæ injections, it appears to me well worthy of trial in poisoning by chloroform and in hydrophobia. Possibly, if life could be prolonged beyond the time that death usually occurs in the latter intractable malady, it might be averted. Whatever doubt may exist as to the necessity of venous injections in a case like the one I have just narrated, there can be little as to the advisability of injecting the veins in hydrophobia; for, as the injections would probably

have to be frequently repeated, such a multiplication of the cutaneous eschars it would be better to avoid.—*Medical Times and Gazette, Dec.* 18, 1869, *p.* 709.

123.—CASE OF POISONING BY ATROPIA.

By Dr. Francis H. Parsons, Admiralty Surgeon, Barking.

A strong healthy man, aged 45, swallowed by mistake rather less than two drachms of solution of sulphate of atropia, which had been prescribed as an ophthalmic remedy for his son. He described the taste as like that of quinine; but thought nothing more about it until symptoms began to manifest themselves. When I was called to his assistance, he was perfectly conscious, and able to describe his symptoms clearly. He said that he thought he had accidentally swallowed some solution of caustic, which his son was using for his eyes. I therefore tested the three or four drops that remained in the bottle, with a little chloride of sodium, but, getting no precipitate, I began to suspect that he had taken atropia. An emetic of mustard and warm water was immediately administered, and followed, after a short time, by vomiting. The pupils now became dilated, and he complained of excessive dryness of the mouth and throat, with a sensation of burning and choking, He had great difficulty in swallowing, but the respiration was free, the pulse was 130. He complained of great dizziness, and a sensation of weight on the top of his head, and over his eyes. He had frequent rigors, and loss of muscular power, being unable to walk, or, as he expressed it, "to feel his legs," he became very restless and agitated; he had great difficulty in articulation, and micturition was only accomplished after some trouble.

The stomach having been thoroughly evacuated, by means of the stomach-pump, animal charcoal was administered to the extent of four ounces, and some solution of carbonate of ammonia was given at frequent intervals. After about two hours he became very drowsy, but was kept awake with strong coffee for eight hours; after which he slept soundly for some time. On the following morning, his pulse had fallen to 50, he still complained of dryness of the mouth and throat, and slight dizziness; the pupils were somewhat dilated, but he was able to read large print. A dose of castor-oil was ordered, and a continuance of the ammonia. He had quite recovered in forty-eight hours and was able to walk out on the third day. A peculiar effect was noticed by all his friends; his hair, which had been previously but slightly tinged with grey, had become almost white. —*British Medical Journal, Dec.* 25, 1869, *p.* 675.

124.—USE OF BELLADONNA IN CONSTIPATION.

By Dr. F. B. NUNNELEY.

[The remarks in the following paper on the medicinal treatment of constipation, by means of belladonna, are founded upon experience at the York Dispensary.]

The method followed was, in the main, that recommended by Trousseau. Extract of belladonna was given in doses of gr. $\frac{1}{4}$ to gr. $\frac{1}{3}$ on rising every morning. A grain of the extract and gr. iij. of the extract. gentianæ were divided into six pills, and one to four prescribed for a dose.

On analysing the cases of constipation, both recent and of long standing, it was found that the greater number were associated with dyspepsia, and especially with that form presenting more or less the characters of gastric irritation, in which the tongue was thinly furred, with prominent red papillæ at the tip, and in which there was tenderness at the epigastrium, pain, especially after food, and often more or less headache. Patients with these symptoms presented themselves with a history of inactive bowels for several months or years, often stating that they were obliged to take aperient pills, senna, castor-oil, &c., once or twice a week to produce an evacuation. The ages of those patients varied from twenty to sixty years of age, the majority lying between twenty-six and fifty. To these belladonna was given for from one to three weeks. It nearly always caused an evacuation, usually of solid stools, after breakfast on the morning on which it had been taken. Generally the bowels continued regular after the belladonna was discontinued, and sometimes headache was greatly mitigated. In one case, the patient, a woman, aged 47, had had constipated bowels for twenty-six years, for which she had taken pills or castor-oil once a week. Belladonna restored the natural daily action in fourteen days. In a few cases no permanent cure was effected, but relief could be obtained by taking belladonna every second or third day, the dose had not to be augmented, and no increased constipation followed its use.

In more recent cases the natural action of the bowels was restored in a few days: thus a man had taken pills every other day for five weeks, but the bowels acted naturally after taking belladonna for six days.

Treatment was specially directed to the dyspepsia in all cases, but no aperient except belladonna was given, and frequently not this, until the effect of regulated diet and habits, and of general treatment, had been observed.

The remaining cases of constipation occurred in very various diseases. Most often belladonna acted as an ordinary aperient

when given in the manner before stated, and its use had not to be continued more than from one to three weeks to cure the constipation. Rarely, it produced no effect even in doses of gr. ½ to gr. j, except causing dryness of the throat: such a failure occurred in the third stage of phthisis.

Belladonna in the usual dose of gr. $\frac{1}{6}$ to gr. ½ produced no dryness of the throat, or dilatation of the pupil, but presented the following advantages over ordinary purgatives:—It did not gripe but gave usually a healthy solid stool, increased constipation did not follow its use, and it very often restored the natural action of the bowels, so as to render a recurrence to this or other aperient unnecessary. Another and important advantage is the small bulk in which the remedy can be given.—*Practitioner*, *April* 1870, *p.* 217.

125.—ETHER AS A STIMULANT-SEDATIVE.

The experience of an eminent Judge.

[The following interesting facts were communicated to Sir James Alderson, the President of the College of Physicians, by Sir Frederick Pollock, late Chief Baron of the Exchequer, by whose desire they are published. Sir F. Pollock has reached the great age of 86, yet still retains his mental energy and activity.]

About six years ago, he was led to adopt ether-inhalation by the occurrence of symptoms which, though not dangerous, were annoying, and had a chronic depressing tendency. Besides a certain amount of indefinable nervous malaise, he suffered specifically from gastric flatulence and painful spasm, occurring almost constantly during meals. His attention was drawn to the possibility of getting relief from these inconveniences by taking some stimulant-narcotic, and he remarks, in one of his notes, that many elderly persons, who have lived intellectually laborious lives, have taken to the use of tobacco, or of opium, with a view to assuaging sleeplessness, and other nervous troubles which are very common at that period of life. Both tobacco and opium, however, disagree with Sir F. Pollock, or at least fail to produce the required effect. He therefore made experiments with the best rectified ether, which he inhaled from an ordinary bottle applied to one nostril; and it soon became apparent that a few whiffs, taken in this manner, were sufficient at once to quiet spasm and pain, and to induce a general tranquillity of the nervous system. It is needless to say that only very small quantities of ether can enter the blood in such inhalations as are now described, since not only does much escape at once into the air, but of that which is actually breathed

a large proportion is simply expired again without being absorbed; and the smallness of the dose physiologically appropriated is sufficiently proved by the fact that true anæsthetic phenomena are never produced. At most, when several strong whiffs have been taken continuously, especially if the temperature of the ether has been raised by holding the bottle a long time in the hand, a dizziness has been produced—just enough to amount to slight vertigo when the standing posture has been attempted; but on careful inquiry it does not appear that this degree of etherisation is necessary for the relief of the uncomfortable sensations on account of which the practice was originally adopted. So far from consciousness being disturbed or clouded by the use of the ordinary small doses of the vapour, it would seem that the intellect is both tranquillized and fortified by them. They fail to produce the least numbness of peripheral sensory nerves. Nor do they at all *compel* sleep; although by removing nervous irritability, they evidently favour its occurrence when it would otherwise be difficult to procure.

The practice of ether inhalation, as above described, has been steadily continued by Sir F. Pollock up to the present time, and the general facts observable are the following:—Both his physical and mental health may be called magnificent, considering his advanced years. The pulse is regular and firm, of medium tension, and keeps very nearly to the standard of eighty; it does not appear to vary materially either during or after an inhalation. Not merely can gastric spasm and flatulence be relieved with the same instantaneous certainty as at first, but the tendency to such affections has evidently and notably diminished. Sleep is obtained, at intervals, to the amount of, perhaps, eleven hours out of the twenty-four, including a regular mid-day siesta. As is common in advanced age, not much solid food is taken; but a moderate amount of alcoholic liquids (brandy and sherry) are consumed, in small doses. The appetite for solids is visibly diminished when any considerable amount of ether has been inhaled shortly before a meal. There is not the smallest impairment of muscular co-ordination proper; and in regard to this it may be mentioned that the handwriting is singularly vigorous and perfect. So free are the muscles from tremor that till quite lately Sir Frederick could balance a full wine-glass on the backs of his closed fingers and lift it to his lips without spilling; and even now the hand can be held out for a long time without a visible shake. At present the inhalations are very frequently taken, and a variable quantity of ether, amounting sometimes to several ounces in a day, is used; but of course it is impossible to calculate how much of this enters the blood. We may conclude this detail of the facts observed by stating that a few extra whiffs, of exceptional

vigour, produce slight flushing of the face, and a feeling of fulness in the nasal mucous membrane.

[There are social reasons which make it desirable to search for a better stimulant wherewith to soothe the nervous system of the aged than either alcohol, tobacco, or opium. We confess to a prejudice in favour of some agent which should be inhaled rather than one which should be drunk; but the number of substances which could be safely inhaled without the presence of a medical man is very limited. Neither chloroform, nor any of its substitutes except ether, would be reasonably safe. The latter drug, however, inhaled in the manner described by Sir F. Pollock, is free from all danger to life, and can very easily be kept down to the production of its purely stimulant effects. We have not personally had much experience of the inhalation of these very small doses of ether; but we have very often experimented on ourselves with small quantities taken by the stomach, and can report that the effect of these upon the nervous system is not in the slightest degree depressing, but tranquillizes only by stimulating and thus steadying the nerves. There is no temptation to take ether by the mouth, however, as it is disgustingly nasty; and this is a real advantage. Nor is it likely to be taken in any large excess by the kind of inhalation above described, as its smell is only tolerable, and by no means attractive. Without, then, expressing any positive opinion on the matter, it appears decidedly worth inquiring whether ether-inhalation might not be advantageously recommended to a large class of aged persons who would scarcely call themselves patients at all, but to whom "the grasshopper is a burden" from the irritable state of their decaying nervous systems. It used to be a maxim of medicine, that the physician is as much bound to promote the euthanasia of the sick when they *must* die, as he is to save their lives if that be possible. And surely the phrase euthanasia may be reasonably enlarged so as to include not merely the management of the illness which actually cuts off an aged person at last, but the solace of months or years of a continuous decay which is the visible precursor of death. ED. *Pract.*]—*Practitioner*, *Dec.* 1869, *p.* 357.

126.—A NEW SUBCUTANEOUS ASPIRATOR.

An instrument, to which the foregoing name has been given, has been presented to the Imperial Academy of Medicine, Paris, at its meeting of the 2nd inst. Its inventor, Dr. Dieulafoy, communicated at the same time the following note as to the objects which the instrument is intended to serve:—

"The Subcutaneous Aspirator appears to me to fulfil two principal conditions: firstly, as a means of diagnosis; secondly, for treatment. We know how difficult it is to recognise sometimes the presence of a purulent depot concealed under muscles or aponeuroses in the centre of such regions as the neck or iliac fossæ, or situated deep in such organs as the liver or kidney. The observer is necessarily undecided as to the presence and nature of the fluid, which does not for some time declare itself either by swelling or fluctuation. It was for the purpose of elucidating these doubts that the exploring trocar has been devised. But that instrument carries with it its own condemnation, being, at the same time, too large and too small. Its size is considerable compared with that of the fine needle used for subcutaneous injection; yet, in spite of its considerable diameter, it hinders frequently the escape of liquids if they be at all dense.

"To remedy these difficulties I have constructed long canulæ so fine that the most delicate organs may be traversed by them without being injured more than by acupuncture needles. This trocar is introduced in search of the supposed liquid, a vacuum is easily produced with the piston, and the operator is at once informed of the presence, seat, and nature of the collection. This means of exploration is specially applicable to cysts, and all serous, hemorrhagic, purulent, or urinary collections.

"As a means of treatment the aspirator serves many purposes. It will evacuate an articular abscess without the introduction of a single bubble of air, and with an opening so small as to be incapable of producing any ill result. Would not analogous treatment be applicable to pericardial effusions? Would it not be available for removal of urine in case of retention of liquid in encysted pleuritis and in congestive abscesses?

"The evacuation of the fluid may be rendered continuous by means of the double stopcock, and if an injection—tincture of iodine or alcohol—is necessary, it may be made at the same sitting, and without displacing the instrument.

"The use of the instrument has been also suggested for the removal of the gases which accumulate in intestinal obstructions, and which greatly impede the return of a hernia."

One detail of construction is strongly insisted on by the inventor. When the stopcocks have been closed, and a vacuum has been created by the withdrawing of the piston, it may be locked at the top of its course by a slight turn to the right. Thus, the needle having been first introduced, it will be sufficient to attach the aspirator and open the cock, when the liquid will at once rush into the barrel of the syringe without the least movement on the part of the operator.

The instrument is manufactured by Messrs. Robert and Collin, of Paris.—*Medical Press and Circular, Dec.* 1, 1869, *p.* 437.

127.—ON EXCISION OF THE KNEE.

By Dr. G. M. Humphry, Professor of Anatomy, and Surgeon to Addenbrooke's Hospital, Cambridge.

[Dr. Humphry has performed this operation thirty-nine times. Twenty-eight recovered, two died, nine underwent amputation; of these five recovered and four died. The limb is, of course, slightly shortened, but this is no disadvantage, as it facilitates the *swing* of the limb forwards in walking.]

In the majority of the cases the disease in consequence of which the operation was performed had commenced in the synovial membrane, and had made its way slowly through the cartilages, more or less deeply, into the bones, so as to leave little or no prospect of a useful joint or of the limb being preserved.

In some the disease had passed away and sinuses resulting from an ulcerated state of the bones had healed, but the joint was contracted and the articular surfaces were distorted beyond the hope of benefit from extension and mechanical appliance. In these two classes of cases, and in some others, excision offers the prospect of a very useful limb, a better prospect, so far as my experience goes, than does any other procedure, and it does so with little risk. I say with little risk, because the operation, though extensive, is, as in the case of other operations in which osseous structures are chiefly concerned, not usually followed by much constitutional disturbance. No large vessels or nerves, and not much muscular tissue, are involved. The chief danger to be feared is a continuance of suppuration, undermining the health and rendering amputation necessary. This may probably be lessened by improved treatment after the operation. It is most likely to occur in patients of strumous temperament. In such persons, as mentioned in my former paper, disease lingers long in the synovial membrane, causing thickening and other changes in it, and tedious suppuration is not unlikely to follow excision. This was the most frequent cause of failure in my cases.

The operation of excision of the knee recommends itself, therefore, partly at least, on the following grounds. When disease has proceeded to such an extent as seriously to alter or destroy the synovial, cartilaginous, or osseous structures of the joint (which, be it observed, commonly may, and in the upper class

of society usually is, prevented by early attention and rest), it is almost in vain to expect that a useful joint can be restored, by which I mean a joint with useful movement and able to bear the weight of the body well. Indeed, the limited movement which remains is, commonly, worse than useless; it is mischievous, by entailing weakness, with liability to return of disease, and permitting contraction to ensue. The best result that can take place in such a case is the complete abolition of the joint with anchylosis of the bones. Even if the limb be bent or otherwise distorted, it is more likely to be useful when anchylosed than if movement continued. Unfortunately, as we know, this result does not very often take place at the knee. As the disease subsides the articular surfaces become united, and that, perhaps, in parts only, by a soft fibrous medium, which permits some movement, and has little disposition to ossification even under the long-continued favorable condition of perfect rest. In most of the limbs rendered crippled, useless, and wasted by disease of the knee, some movement of the joint remains, insufficient for any useful purpose, but enough to disable the limb from bearing weight; and mechanical supplements, even if they answer their purpose, are by most persons unattainable. By excision this difficulty is overcome, the remaining portions of the joint, which serve only to render the limb useless, are removed, and anchylosis of the bones is effected. In short, we bring about by the operation that condition which we would gladly see attained without such interference.

I usually commence the operation by a semilunar incision, with the convexity downwards in front of the knee, then reflect the skin a little, cut into the joint, remove the patella and as much of the diseased synovial membrane as I can, expose the articular surfaces, and saw off the diseased parts.

It is sometimes necessary to saw off a second or a third slice, or to gouge out ulcerated or diseased portions; and it is better to apply the saw two or three times than to remove recklessly large portions at first, though this may have the trifling advantage of expediting the procedure. I do not reflect the circa-periosteal tissues close, but prefer to saw them off with the bones, so as to leave the latter well covered at their edges, and therefore less liable to ulcerate. It is also very important so to saw the bones that when the cut surfaces of the tibia and femur are placed in contact they fit well to each other, the line of the limb being straight, *i.e.*, not bent, or with the leg inclined to either side.

I am very careful to sponge the wound well and secure the bleeding vessels, so as to prevent hemorrhage taking place after the patient is placed in bed, for the collection of blood in the

wound prevents early union and entails suppuration. Ligatures should, if possible, be avoided, and torsion used instead, so that no foreign body is left in the wound.

Having taken these precautions and placed the cut surfaces of the bones in as complete apposition as possible, I bandage the limb along its whole length, except in the line of the wound, upon a splint placed behind and provided with a foot-piece. I then unite the edges of the wound by sutures and apply long splints on the sides, with pads placed above and below the knee, so as to defend the operated part from undue pressure, and to permit discharge to escape in the event of suppuration taking place. The limb is thus firmly secured in its whole length, except at the wound, which is left exposed. The bandages are moistened with blood, which sets and affords additional security. I am very particular to adjust things well and firmly in the first instance, and am very unwilling to disturb the limb afterwards. Indeed, I frequently do not remove any of the bandages or splints for five, six, or more weeks; and by this care and perfect quiet I endeavour to promote immediate union, which, not uncommonly, takes place throughout the entire wound. If this fails to take place and suppuration ensues, I still do not remove or change the bandages and splints, unless there is some unusual reason for doing so, but allow the discharge to escape at the sides and adopt various means to maintain cleanliness. This perfect quietude and abstinence from removal of the bandages first applied is, I consider, a very important item in the treatment. It is equally important not to discontinue the splints till the bones are quite firmly united, till the patient can raise the limb from the bed by its own muscles, without any movement being perceptible between the tibia and femur. It is necessary to make quite sure of this. For that purpose I watch closely when the effort to raise the limb from the bed is first made, because any slight movement is then most easily detected; and if the patient is allowed to get up while movement, however slight, takes place between the bones, the part is liable to become bent, or the process of anchylosis may be suspended, and the good result is thus marred. This flexure, as already stated, took place in some of my cases. It, as well as failure of firm union between the bones, has occurred in the practice of others; but they may be always, or generally, avoided by attention to the directions I have given.

The cancellous parts of bones, whether broken or cut, commonly unite well and quickly, and the opposed surfaces of the tibia and femur, after excision of the knee, form no exception to this rule. I have often been surprised at the rapidity with which the wound healed and the bones grew together.

When suppuration takes place and continues, careful management is required, for which it is impossible to lay down rules. Much judgment also is needed in deciding on the propriety of laying open sinuses and exposing or removing carious bone, and still more in determining the period beyond which it is unsafe to defer the removal of the limb. The result proved in some of my cases that I had delayed this too long; and in others the examination of the part after amputation indicated that, with additional patience and well-directed incisions, the limb might have been spared.

Excision of the knee is an operation requiring care in the execution, and care and patience in the subsequent management but it is not an operation of much danger, and by it, I am sure, many an amputation might be avoided, and many crippled, worse than useless, limbs, such as we daily see carried about our streets, might be rendered good helpmates to their fellows.

[Dr. Humphry has since performed the operation six times; five have recovered, and one is under treatment. This makes the number of operations forty-five, recoveries thirty-three.]—*Medico-Chirurgical Transactions, Vol.* lii., 1869, *p.* 15.

123.—HOSPITALS.

By the late THOMAS NUNNELEY, Esq., Surgeon to the Leeds General Infirmary.

My beau ideal of an hospital is the combination of large, cheerful wards, having plenty of air and light, with enough space for exercise, in which chronic and convalescent cases, minor injuries, operations, and diseases may be advantageously placed; with a sufficiency of small and different sized wards, capable of accommodating from one to six or eight patients. In these I would place every serious injury, capital operation, or acute disease, and more especially all offensive and contagious affections, which, as now usually put in the large wards, are, I believe, not only disgusting to the other inmates, but the not unfrequent cause of "hospitalism" and death to them. To place a sufferer from a large scald or burn, an old stinking ulcer, a gangrenous wound, cellular erysipelas, with large fetid sloughs and suppuration, cases of incontinence of urine or fæces, and such-like affections, as has now to be done in the Leeds and some other new hospitals, is, in my opinion, contrary to all propriety, and so injurious as to seriously militate against the philanthropic object for which such enormous outlay has been made—varying from at least £400 in the Leeds Infirmary, to considerably more in others, for each bed occupied.—*Lancet, Feb.* 12, 1870, *p.* 227.

129.—THE MORTALITY OF LIMB-AMPUTATIONS AS REGULATED BY THE SIZE OF HOSPITALS, AND THE DEGREE IN WHICH PATIENTS ARE AGGREGATED OR ISOLATED.

By the late Sir J. Y. Simpson, Bart.

In the two previous parts of these communications on Hospitalism we have seen that in our large metropolitan hospitals about 41 in every 100 operated on die of those patients who are subjected to the four major amputations of the limbs; while in single or isolated rooms in country practice patients die, under the very same class of operations, to the extent only of 10 or 11 in every 100. In the last chapter we have collected evidence of the death rate from these same four major limb-amputations in British provincial hospitals of various sizes. If we throw the whole facts thus collected into a tabulated form, the general results may be stated as follows:—

Size of Hospital.	*Death rate.*
1*st Series.*—In large and metropolitan British hospitals, chiefly containing from 300 to 500 beds or upwards, out of 2089 limb-amputations 855 died, or	1 in 2·4
2*nd Series.*—In provincial hospitals containing from 201 to 300 beds, out of 803 limb-amputations 228 died, or	1 in 3·5
3*rd Series.*—In provincial hospitals containing from 101 to 200 beds, out of 1370 limb-amputations 301 died, or	1 in 4·4
4*th Series.*—In provincial hospitals containing from 26 to 100 beds, out of 761 limb-amputations 134 died, or	1 in 5·6
5*th Series.*—In provincial hospitals containing 25 beds or under, out of 143 limb-amputations 20 died, or	1 in 7·1
6*th Series.*—In British private country practice, with the patients operated on in single or isolated rooms, out of 2098 limb-amputations 226 died, or	1 in 9·2

These data go to point out and establish the general fact or general law in hospital hygiene, that the death-rate accompanying amputation of the limbs,—and, as we may infer, the death-rate accompanying other surgical operations, and many medical diseases also,—is regulated in a great and marked manner by the size of the hospitals, and the degree of aggregation or segregation in which the patients are treated. But like all other

general laws in medicine, this law is subject to many exceptions. Thus, a small hospital, if overcrowded with beds and patients, becomes as insalubrious as a large hospital under one roof. On the other hand, a large hospital would be generally made almost as salubrious as a small institution, provided few beds were left scattered over its wards, and these wards were well ventilated and often changed. But such exceptions only establish more securely the great and important hygienic law, that, in the treatment of the sick, there is ever danger in their aggregation, and safety only in their segregation; and that our hospitals should be constructed so as to avoid as far as possible the former, and secure as far as possible the latter condition.—*Edinburgh Medical Journal, Dec.* 1869, *p.* 532.

130.—THE CASE OF THE LATE MR. JUSTICE HAYES.

By Dr. GEORGE JOHNSON.

[This case is published by Dr. Johnson at the request of a near relative of the patient, in the hope that it may lead to some improvement in the ventilation of the Court in which he sat as Judge. Mr. Justice Hayes left his home in the country in his usual good health on Friday morning, Nov. 19th.]

He sat all day in the Bail Court at Westminster, and it was observed that during the day he appeared unusually fatigued and, as it seemed, excited. After the rising of the Court, he transacted some business in the Judge's private room, when, just as he was about to leave the chamber, he became suddenly faint, sick, and paralytic. I saw him at half-past six, in consultation with my friend, Mr. Bond, of Parliament-street, who had been called in immediately after the seizure. The Judge was then quite conscious, but completely paralysed on the left side, both eyes being turned to the right. There was frequent vomiting, and so much prostration that it was some hours before we ventured to remove him to the Westminster Palace Hotel. There was a temporary rally, but subsequently increased drowsiness deepened into coma, and he died on the evening of the fifth day after the attack. All the circumstances of the seizure, and the subsequent progress of the symptoms, indicated a copious hemorrhage into the brain.

One of the first remarks that the Judge made to me was that he had never felt better than when he left home in the morning; but he said, "I have been breathing all day the pestiferous atmosphere of the Court."

That breathing a close and impure atmosphere may be the immediate exciting cause of cerebral hemorrhage is certain.

The blood, imperfectly aërated, and charged with the exhalations from numerous lungs breathing the same atmosphere, is impeded in its passage through the minute arteries, whose muscular walls contract and hinder its progress. Hence the sense of fulness, pain, and throbbing in the head, while the heart beats with increased force to overcome the impediment and to drive on the blood. If heart and bloodvessels are sound and strong, the inconvenience is only temporary, and fresh air acts as a quick restorative. If the heart is weak, faintness may result from a defective circulation through the brain; and, on the other hand, if the arteries which supply the brain have weak and brittle walls, the increased strain to which they are subjected while the heart is beating with unusual energy to force the blood through the minute arteries which dispute its passage, may result in the rupture of a vessel, and consequent hemorrhage into the brain. That this happened in the case of Mr. Justice Hayes is certain, and that the exciting cause was "the pestiferous atmosphere of the Court" is highly probable.—*Lancet, Dec.* 11, 1869, *p.* 824.

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